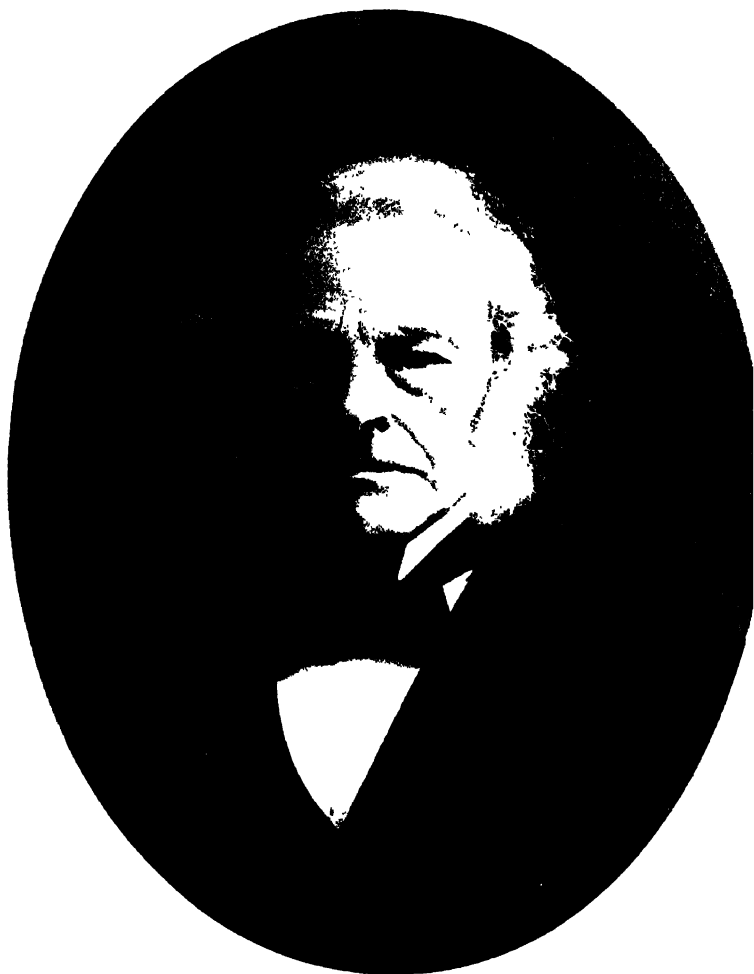
JOURNAL OF THE TRANSACTIONS

OF

THE VICTORIA INSTITUTE.

VOL. XXXV.



Sir George Gabriel Stokes, D.C.L., F.R.S.

Late President of the Victoria Institute.

JOURNAL OF
THE TRANSACTIONS
OF
The Victoria Institute,
OR,
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EDITED BY THE SECRETARY.

VOL. XXXV.



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CONTENTS.

**** *The Institute's object being to investigate, it must not be held to endorse the various views expressed at its meetings.*

PREFACE.

IN the preparation of this Volume of the *Journal of Transactions*, I have to express my acknowledgments to the Authors of the papers for the pains they have taken to render the published matter as free from inaccuracies as possible. I would also esteem it a favour if Members and Associates would not only send communications on subjects they think interesting and suitable for bringing before the Institute, but also suggest titles of such subjects, and the names of persons they consider qualified to deal with them.

EDWARD HULL,

Secretary and Editor.

August 1st, 1903.

ANNUAL GENERAL MEETING.

HELD AT THE HOUSE OF THE SOCIETY OF ARTS, MONDAY, JUNE 15, 1903.

Sir JOSEPH FAYRER, Bart., K.C.S.I., M.D., F.R.S. (Vice-President), IN THE CHAIR.

The CHAIRMAN.—Ladies and gentlemen, I think my first duty is to apologize to you for being here, but the demand upon the time of the recently elected President, on important matters in the House of Lords, has prevented him from attending. The accident of my being the senior Vice-President here, has placed me in the position of having to perform a duty for which I feel very unfit. However, I must ask you to accept me, as graciously as you can, as a substitute for the very distinguished noble Lord who was to have addressed you.

I will now call upon the Secretary to read the last Annual Report.

The SECRETARY (Professor EDWARD HULL, LL.D., F.R.S.).—Mr. Chairman, ladies and gentlemen, before I proceed to read the Report, I have to communicate to you a letter of apology which I have received from our President, the Lord Chancellor, through his Secretary, for his absence on this occasion: "Dear Sir, the Lord Chancellor desires me to say that he would have wished very much to have occupied the chair as President of the Victoria Institute on

this occasion, at the Annual General Meeting on Monday next, but, unfortunately, he will be prevented from doing so by the fact that he has to take his seat on the Woolsack in the House of Lords at that very hour, yours faithfully; R. C. Norman (Secretary)."

While regretting the absence of his Lordship, we must take care, on a future occasion, to make the hour convenient for him to be present.

I have also letters of apology from Professor Lionel Beale, Dr. Chaplin, Sir Fowell Buxton, and Mr. David Howard, Vice-President, who is on the Continent.

The SECRETARY then read the Report, as follows:—

1. In presenting the THIRTY-SEVENTH ANNUAL REPORT, the Council have the pleasure of stating that the Institute has had, on the whole, a successful session, and that the financial condition is satisfactory. We entered the year 1902 with a balance of £6 3*s.* 11*d.*; whereas we commenced the present year with a balance of £33 1*s.* 9*d.*, all claims having been paid. This satisfactory position of our finances is due to the plan which has been adopted of paying all bills as they fall due, and to the exercise of economy in management.

2. As regards Membership. The Council regrets a falling off in the number of annual members and associates, probably due to the severe monetary pressure of the past year; while there is a slight increase in the number of life members and associates. This decrease is more apparent than real, as it had been the practice in past years to allow names to remain for a long time after the subscriptions had ceased to be paid, with the hope that the subscribers would renew their subscriptions in the future year—a hope sometimes happily realised. The list now presented may be considered as approximately correct. The following is the statement of the numbers of the constituency of the Institute at the end of May last:—

Life Members	46	in number.
Annual	161	"
Life Associates	69	"
Annual Associates	436	"
Hon. Corresponding Members and Associates	172	"
Total	884	

3. The following is the new list of the Officers and Council :—

President.

The Right Honourable The Earl of Halsbury, M.A., D.C.L., F.R.S. (Lord Chancellor).

Vice-Presidents.

Sir T. Fowell Buxton, Bart., K.C.M.G.
Sir Joseph Fayrer, Bart., K.C.S.I., M.D., F.R.S.
Professor Lionel S. Beale, F.R.C.P., F.R.S.
W. H. Hudleston, Esq., F.R.S., F.G.S.
Alexander McArthur, Esq., D.L., J.P.
The Ven. Robinson Thornton, D.D., F.R.Hist.S., *Archdeacon of Middlesex.*
David Howard, Esq., D.L., F.C.S.

Honorary Correspondents.

The Right Hon. Lord Kelvin, Past P.R.S.
Professor A. Agassiz, D.C.L., F.R.S.
Professor Etheridge, F.R.S.
Professor E. Naville (*Geneva*).
Professor Maspero (*Paris*).
Professor Fritz Hommel, Ph D.
Professor A. H. Sayce, D.D., LL.D.

Honorary Auditors.

J. Allen, Esq.
Lieut.-Col. Mackinlay, late R A.

Honorary Treasurer.

Edward Stanley M. Perowne, Esq.

Secretary and Editor of the Journal.

Professor Edward Hull, M.A., LL.D., F.R.S.

Council.

(*In Order of Election.*)

Rev. Principal James H. Rigg, D.D.
Maj. Kingsley O. Foster, J.P., F.R.A.S.
D. Howard, Esq., D.L., F.C.S., F.I.C., *f.c.* (*Trustee*).
Rev. Dr. F. W. Tremlett, D.D., D.C.L., Ph.D.
Very Rev. Dean Wace, D.D. (*Trustee*).
Rev. Chancellor J. J. Lias, M.A.
Gen. G. S. Hallowes, *f.c.* (*H.S.*).
Rev. F. A. Walker, D.D., F.L.S., F.R.G.S.
Capt. E. W. Creak, C.B., R.N., F.R.S.
Thomas Chaplin, Esq., M.D.
Rev. Canon R. B. Girdlestone, M.A.
General Halliday.
Lieut.-Colonel Mackinlay, late R.A.
Theo. G. Pinches, Esq., LL.D., M.R.A.S.
Ven. Archdeacon W. M. Sinclair, M.A., D.D.
Gerard Smith, Esq., M.R.C.S.
Commander G. P. Heath, R.N.
Rev. Canon Tristram, M.A., D.D., LL.D., F.R.S.
Rev. G. F. Whidborne, M.A., F.G.S., F.R.G.S.
Lieut.-Gen. Sir H. L. Geary, K.C.B., R.A.
Walter Kidd, Esq., M.D., F.Z.S.
Edward Stanley M. Perowne, Esq.
Martin Luther Rouse, Esq., B.L.
Rev. R. Ashington Bullen, M.A., F.G.S.
Rev. John Tuckwell, M.R.A.S.

Lieut.-Colonel G. Mackinlay has been appointed Hon. Auditor in succession to General G. S. Hallowes, who for several years generously gave his services in this position, and to whom the thanks of the Council and Members are hereby accorded.

4. *Deaths.*

The Council regret to have to record the death during the past year of the following supporters of the Institute :—

Rev. J. Angus, D.D. (Member of Council), Rev. Canon J. Baker, J.P., F.L.S., J. Hall Gladstone, Esq., D.Sc., F.R.S., Very Rev. Dean E. A. Hoffman, D.D., Charles Meldrum, Esq., C.M.G., LL.D., F.R.S.,

Rev. Canon G. F. Maclear, D.D., Fleet Surgeon J. L. Palmer, F.R.C.S., Rev. A. C. Rowley, M.A., H. M. Simons, Esq., Major-General James A. Steel, Lieut.-Colonel A. R. W. Sedgefield, M.B., Prof. R. Virchow, Sir George Gabriel Stokes, Bart., LL.D., F.R.S. (President of the Institute).

The most severe loss to the Institute in the above list of deceased Members, all of whom were distinguished either in Church or State, has been that of our late President, Sir George Gabriel Stokes, who for eighteen years presided over the counsels of the Institute, and as long as health and other engagements permitted, took an active and personal interest in its affairs. As a short account of our late President's career will appear in the forthcoming volume of the Transactions, it is unnecessary to add anything further here on the subject of the Presidency of the Institute, except to say that it is a matter of great gratification to the Council to announce the acceptance of the office of President by the Lord Chancellor, the Earl of Halsbury, whom we had hoped would be our Chairman on this occasion.

5. *Finance.*

The income of the Institute for the past year was £865 10*s.* 6*d.*, and the expenditure £832 8*s.* 7*d.*, leaving a balance of £33 1*s.* 9*d.* to come into this year's account. The interest on the Gunning Fund no longer forms an asset to the income of the Institute.

6. MEETINGS.

The Meetings of the Institute have been well attended, and the subjects dealt with have been of the usual varied character, and may be arranged under the following heads:—

1. History.

"The Babylonian Story of the Creation." By Theophilus G. Pinches, Esq., LL.D.

2. Geology.

1. "On the Cheesewring of Cornwall, and its Teachings." By Professor Edward Hull, LL.D., F.R.S. (Secretary).
2. "On the Geological Conditions of the West Indian Volcanoes." By Professor J. W. Spencer, Ph.D., F.G.S.
3. "On Volcanic Action, with special reference to the recent eruptions in the West Indian Islands." By Professor J. Logan Lobley, F.G.S., F.R.G.S.

3. Biblical.

1. "On Modern Theories concerning the Composition of Holy Scripture." By Rev. John Tuckwell, M.R.A.S.

4. Biological.

1. "On the unseen Life of our World, and of Living Growth; Design Human and Divine." By Professor Lionel S. Beale, F.R.S., F.R.C.P.
2. "The Living God of Living Nature from the Science side." By the same author.

5. Science and Religion.

1. "The Future of Islam." By Professor D. S. Margoliouth, D.Litt.
2. "The Arya Samaj, or the Reform Movement in India." By Rev. H. G. Griswold, M.A., Ph.D.
3. "Report on the Congress of Orientalists held at Hamburg." By Theo. G. Pinches, Esq., LL.D.

6. General.

1. "On the New Water Supply of Jerusalem." By Dr. E. W. Gurney Masterman and General Sir C. W. Wilson, F.R.S.
2. "Experiences in South Africa during the War." By Rev. W. H. Frazer, D.D.

7. *The Journal of Transactions.*

The thirty-fourth volume of the *Journal of Transactions* has been circulated to almost all parts of the world; certainly to all countries under the British Empire, and frequent expressions of the value in which it is held have been received. Of persons connected with our Society, about 74 belong to the United States of America, 40 to India, 14 to Australia, 12 to Canada, about the same number to New Zealand and South Africa. It is hoped that as this last-named dependency returns to conditions of tranquillity under the Crown, that the Journal will be more widely circulated there.

8. *Conclusion.*

The balance sheet for the year ended 31st December, 1902, is herewith appended; and the Council desires to record its thanks to the contributors of papers, and to its supporters, trusting that they will endeavour to enlist the sympathy and support of their friends. The Council feels satisfied that it only requires such efforts to increase the numbers and extend the influence of the Institute.

Signed on behalf of the Council,

HALSBURY,

President.

A resolution confirming the appointment of Lieut.-Colonel Mackinlay as Hon. Auditor in succession to General Hallowes was then put to the Meeting from the Chair and carried unanimously.

ANNUAL BALANCE SHEET, *from* 1st *January to* 31st *December*, 1902.

RECEIPTS.

	£	s.	d.	£	s.	d.
Balance from 1901				6	3	11
Subscriptions:—1 Life Member	20	0	0			
1 Member, 1898	2	2	0			
1 „ 1899	2	2	0			
2 Members, 1900	4	4	0			
5 „ 1901	10	10	0			
133 „ 1902	279	6	0			
2 „ 1903 paid in advance	4	4	0			
8 Life Associates	79	16	0			
1 Associate, 1897	1	1	0			
1 „ 1898	1	1	0			
4 Associates, 1899	4	4	0			
9 „ 1900	9	9	0			
27 „ 1901	28	7	0			
315 „ 1902	330	15	0			
7 „ 1903 paid in advance	7	7	0			
				784	8	0
Dividend on £1,165 18*s*. 9*d*. 2¾ p.c. Consols				30	2	4
Sale of Books, &c.				34	13	5
Interest to December, 1901, Gunning (Final)				10	2	10
				£865	10	6

EXPENDITURE.

	£	s.	d.
Printing	156	3	6
Postage	35	8	4
Binding	49	6	10
Reporting	26	5	0
Stationery	9	17	6
Expenses of Meetings	17	15	0
Clerk—Salary	113	1	4
„ Insurance	2	11	10
Rent	180	0	0
Housekeeper	0	18	0
Coal and Light	8	18	8
Library	8	15	4
Secretary	210	0	0
Insurance (Fire)	0	12	0
Bank Charges	0	9	11
Sundries	3	12	6
Paid to Gunning Fund Account	8	13	0
Balance	33	1	9
	£865	10	6

There is also a separate account accumulating from the Gunning Fund towards a prize for an Essay to be offered every three years. This stood as under on 31st December, 1902:—

	£	s.	d.
Paid from General Funds	8	13	0
Interest to December, 1902	14	1	2
Total Credit	£22	14	2

We have examined the Balance Sheet with the Books and Vouchers, and find a Credit Balance of £33 1*s*. 9*d*.

June 4th, 1903.

JOHN ALLEN,
G. MACKINLAY, Lieut.-Colonel, } *Auditors.*

The CHAIRMAN.—Ladies and gentlemen, I am sure you must have listened with great interest to this terse, but very expressive Report. It is most satisfactory to know that this admirable Institution is making such steady progress. Its objects are so excellent that everyone must sympathize with it, and it is very gratifying and satisfactory to know that so eminent and distinguished a man, from many points of view, has now undertaken to be its President. He, indeed, has succeeded others of equal eminence in different walks of life, but it is desirable and it is very satisfactory that he should have accepted the office, and I hope, under his auspices, that the Institute will increase and continue to increase and to develop for the useful purposes for which it was founded by the late Earl of Shaftesbury.

I need not attempt to make any further remarks at present, for there is a matter of much more interest to you, viz., a paper to be read by Professor Flinders Petrie. (Applause.)

General HALLIDAY.—I am asked to propose, Mr. Chairman, ladies and gentlemen, that the Report which has now been read and which most of you have in your hands, be adopted and printed and circulated amongst the members and associates of the Institution. It is, after all, but a formal motion and yet there is value even in what is but formal. What we do desire and what we want everyone present to do is to help us to spread a knowledge of what is being done by this Institution, and to increase interest in it. Therefore, I think I may appeal to all here present to signify their approval of the Report as it has been read, so that it may be widely distributed; and, friends, you can all help us in increasing the interest which I feel, and I suppose most of you here feel, to be due to the work which is undertaken by this Institute.

The Rev. Canon GIRDLESTONE, M.A.—Sir Joseph Fayrer, ladies and gentlemen, I am very glad to second this resolution that has been moved by General Halliday.

I think we have reason to congratulate the officers of the Society upon the healthy condition of the Institute.

I think there is one sentence which is most healthy—I mean the sentence which has in it a remarkable air of novelty in the first paragraph: "This satisfactory position of our finances is due to the plan which has been adopted of paying all bills as they fall due." There is such a sweetness and novelty in the phrase of paying bills directly they are due! I am glad the Institute has adopted that

course and perhaps, in our domestic financial arrangements, we may do the same.

The resolution was then put to the Meeting and carried unanimously.

Colonel ALVES.—I have been asked to move and I have much pleasure in moving the following resolution:—

> "That the thanks of the members and associates be presented to the members of Council, their officers, and auditors, for their efficient conduct of the business of the Victoria Institute during the year."

I have nothing to say, and I would not take up your time by saying it if I had, but I have very great pleasure in moving the resolution.

Professor ORCHARD.—I have much pleasure in seconding this resolution—not, indeed, that it requires any seconding, for it speaks for itself. Every Society must be very much dependent, necessarily, on its Council, honorary officers, and auditors; but a Society of this kind is, I suppose, especially so. It arranges for a course of papers, such as will be acceptable, and at the same time useful and beneficial, to those who hear them, and a course of papers which connects science and philosophy with the Christian religion is not, I take it, a very easy task. It requires a knowledge of science and theology—it requires, also, a knowledge of men; and it requires, also, wisdom not only theoretical but practical. How far the Council and honorary officers have succeeded in this I think you will not have much difficulty to determine if you refer to the last paragraph of page 4 of the Report. Certainly those who have had the pleasure of hearing or reading these papers will have had no difficulty whatever in giving their most warm and sincere thanks to those who have arranged the list of papers. I would, if I might be allowed, congratulate the Society on the succession of Lord Halsbury. At the same time I must say we all regret, exceedingly, the occasion that has led to his being President. I would ask you all to join with me in the tribute of admiration (which has been already expressed) to our late President, Sir George Gabriel Stokes, as a scientist who recognized the Creator of the universe, and was not ashamed to declare his convictions. No man stood higher than Stokes as an investigator of Nature—and our regard and affection has been

enhanced by the fact that he was a Christian who was not ashamed to acknowledge Christ. (Applause.)

I have much pleasure in seconding this resolution.

The resolution was put to the Meeting and carried by acclamation.

The CHAIRMAN.—I will now call on Dr. Kidd.

Dr. WALTER KIDD.—On behalf of the Council and officers I beg to thank you for your resolution.

The CHAIRMAN.—It is now my pleasant duty to call on Dr. Flinders Petrie for his address. (Applause.) You will probably anticipate the nature of the subject on which he is going to address you.

The Annual Address (illustrated by lantern slides) was then delivered by Professor W. M. FLINDERS PETRIE, D.C.L., as follows :—

THE ADDRESS.

INTRODUCTION.—The essential difference between mediæval thought and modern thought is that the mediæval scholar dealt with what *ought to be* according to the premises and convictions with which he started; the modern student deals with what *is*, having learnt by bitter experience the fallacies and hopelessness of trusting to systems of theory however beautiful. The further we go with Nature the more we learn that *a* solution need not be *the* solution, that a deduction which may seem certain enough for the known facts, may be modified or even reversed by unknown facts not yet even imagined.

Hence we must carefully separate between the physical facts that we have to deal with, and the framework of theory into which they may be fitted. The facts must remain, however much our appreciation of them may be modified by new facts, which may contradict our suppositions. The man who argues that there can never be any solution of the facts but that which seems inevitable to him is as truly a mediævalist as Cosmas Indicopleustes.

And repeatedly we find that new materials and new views which seem to have led us completely away from the old ground, only bring us back to a different side of the past battlefield. Freewill and fatalism are likely to be just as severely felt, as harshly dominant in debate, when reached by

aggressive materialism in the twentieth century as when fought over by aggressive Calvinism in the sixteenth.

We must then never think that we have got rid of an essential question by turning to a fresh ground of research with new materials and outlooks.

Fully recognizing this limitation of our deductive powers, and knowing that no root-questions are avoided by opening a new field, it is in this spirit that I would state as simply as I can the new facts which have to be taken in account concerning man.

The view of man's nature as a scientific study can only be reached from observation; and the longer a series of observations are, the more we can draw from them. Again, the less complex the causes are, the more truly can we see the results. For both these reasons that course of civilization which is the longest and the earliest is the most valuable as material for study.

Till ten years ago we knew nothing of early civilization. In Egypt and in Greece, thousands of years of changes were entirely hidden from us, which we can now follow and compare. There has never been such an extension of the knowledge concerning man as in the last decade; for the opening of prehistoric man to our view fifty years ago gave no such complete picture, capable of joining at all points with our existing order of things, and carrying back an unbroken view of detail over nearly ten thousand years.

To clear our position it may be said that I do not attempt now to enter on arguments on chronology. That alone is an immense subject, and I cannot at this point deal with the reserves of those—if there be any present—who can conceive of all historic and geologic man being limited by 4004 B.C. or by 5503 B.C. To all who realize that such limits are the expression of partial knowledge, I would say that it is as serious to exceed the deductions from the Septuagint by a century as it is to stretch to myriads or millions of years. It is just as much a sacrifice of truth to take the shortest possible periods as the longest possible; and the only true course is to follow what seems to be nearest to the facts. Without then going into any detail, I may say that we know by records of observations the dates at 1500 B.C. within very close limits. Before that we have the skeleton of history recorded back to about 4700 B.C.; and the recent discovery that the detailed yearly annals of a thousand years were engraved in 3700 B.C. shows what a solid basis there was for writing the early history. Before the historic times all we can say is that in a large district that we have studied, the graves are certainly more than half as

numerous as those belonging to the 5,000 years of history; and therefore to allow 2,000 years for this much less civilized period is the least that is likely.

The illustrations which were shown at the Annual Meeting dealt with four divisions of the early civilization. The mechanical ability was illustrated by the working of vases of the hardest stones, the brilliant skill in flaking flints, the pottery and its succession of forms which enable the graves to be classified into different ages, and the rise of stone working for masonry in the historic times. The artistic skill was shown from the earliest age of rude drawing which has no features, through the ivory carvings of the prehistoric age, down to the incoming of the dynastic race whose slab carvings show a far higher power which culminates in the figure of an aged king of the first dynasty lately found, a figure which has never been excelled in Egypt. The ideas and beliefs were illustrated by the great amulets of the sacred serpent to hang in the houses, and by the prevalence of four antagonistic theories of the future which belonged to different races. The power of recording was demonstrated by simple marks of ownership on pottery in the early prehistoric age, the abundance and variety of such marks, and their continuity through the later ages, until they were crystallized into an alphabetic system by the Phœnician numeration for trade purposes. Probably they were first personal, then expressed ideas, then words, and lastly syllables and letters. This system on the Mediterranean shores is far older than the hieroglyphs, which were brought in by the dynastic race ready developed, probably from the east. The hieroglyphic writing was first used only to label pictures, and during the first dynasty it develops from mere titles into a more structural form of language.

On each side of man's activities we can now trace continual fluctuation of advances and stagnations, which gradually lead from the man clad in goat skins up to the powerful rulers of a highly organized kingdom, full of technical skill and artistic powers.*

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* The remainder, and principal portion of the address, consisted of a description of a large number of lantern slides thrown on the screen, illustrating the results of Professor Petrie's operations in Egypt during the past season; the most interesting, perhaps, of the antiquities being a statuette of Cheops carved in ivory with the name legibly engraved on the statuette itself. This great monarch, it will be recollected, was the builder of the Great Pyramid, and the face of the statuette indicates that of a man of strong will, capable of carrying out so colossal a work.

The CHAIRMAN.—Ladies and gentlemen, it is my duty now—and a very pleasant duty it is—to call on Colonel Mackinlay to offer to the lecturer our thanks, as I know you will all desire, for his extremely interesting and charming lecture in which he has taken us, in this short time, through a period of some 8,000 years. I will not say anything on the subject, but will call on Colonel Mackinlay to do so.

Lieutenant-Colonel MACKINLAY.—It is my pleasant duty to propose the following resolution, that "the best thanks of the Institute be offered to Professor Flinders Petrie and to those who have read papers during the session." You have already heard of the papers that have been read, and I think I may justly say they have been splendidly crowned by the lecture we have just heard. We have been told it is only during the last ten years that this subject has been investigated, and we have had the pleasure of hearing some of the very oldest history from one of the foremost leaders of this branch of research. I have, therefore, much pleasure in moving this resolution, which I am sure we shall pass with the greatest unanimity.

Dr. THEOPHILUS PINCHES, on rising to second the resolution, said: It is needless for me to say that I have very great pleasure in seconding the vote of thanks which Lieutenant-Colonel Mackinlay has proposed. As one who knows something of the subject, I must say that I found this lecture most interesting and instructive, and whilst listening to it and to all the wealth of information it brings, I cannot help thinking that the subject which I represent (Assyriology), with all its wealth of inscriptions, cannot furnish, by any means, the same amount of information, and, naturally, one looks forward and asks oneself whether Assyria and Babylon will ever be so fruitful. The climate, undoubtedly, was against the preservation of objects in Babylonia, but still it is possible that something may be found. These lessons that we got from such simple things as household utensils and pots—it is quite a revelation when one sees them depicted in succession of time on the screen; and when speaking of these simple things to which Professor Petrie has referred us, I certainly think of all the theories which have been brought forward, that concerning the origin of the alphabet is the most promising. We do not know, it is true, the value of these old marks which he has thrown on the screen; but I fully expect that

when their value is known we shall find that they confirm the theory that he has brought forward. (Applause.)

The resolution having been put to the Meeting by the Chairman, was carried by acclamation.

Rev. JOHN TUCKWELL.—It would not be becoming to separate, I think, without returning our very cordial thanks to the Chairman for presiding over us this afternoon. He came to fill a gap—not always a very enviable position to occupy—and he has helped us out of a difficulty, and I beg to move that our very hearty thanks be given him.

The SECRETARY.—I have much pleasure in seconding that resolution. I think we are all indebted, and certainly I am, personally, to Sir Joseph Fayrer for so kindly consenting to occupy the chair at this critical time.

The resolution was carried unanimously.

THE LATE PRESIDENT.

Brief Sketch of the Career of Sir George Gabriel Stokes, Bart., F.R.S., D.C.L., LL.D., late President of the Victoria Institute.

It is fitting that a brief sketch of the career of our late President should appear in this volume of the *Transactions*, and to those of our members who were only acquainted with this accomplished man by reputation the following biographical record will not fail to be acceptable. Sir G. G. Stokes came of a family which has produced several men of high reputation in various departments of literature, science, and art, amongst whom may be specially mentioned the late Dr. William Stokes, Regius Professor of Medicine in Dublin University, whose statue adorns the hall of the Royal College of Physicians in that city,* and his son Dr. Whitley Stokes, C.S.I., formerly Secretary to the Government of India in the Legislative Department, and subsequently law adviser to the Council of the Indian Government, happily still surviving amongst us. Nor ought we to omit to mention his sister, the late Miss Margaret Stokes, well known for her researches into the Celtic history of her own country, Ireland, and that of the Continent.

The late President was the son of an Irish clergyman, and was born at Skreen, co. Sligo, on August 13th, 1819. He was educated at Dr. Wall's school, in Dublin, and afterwards at the Bristol College. Having graduated at Pembroke College, Cambridge, taking his B.A. in 1841, as Senior Wrangler, he was elected to a Fellowship. Cambridge University henceforth became the scene of his future labours, which were chiefly in the field of high mathematics and physics; and he was a frequent contributor of papers to the *Cambridge Philosophical Transactions.* In 1851 he was elected a Fellow of the Royal Society, of which he was chosen in 1854 one of the Secretaries, and afterwards its President, on the retirement of Professor Huxley; thus attaining to the highest position open to

* The statue is life size in marble, by Foley.

men of science in this country. At the meeting of the British Association at Exeter in 1869 he was elected its President, and during this period of his career he was elected an honorary member of several foreign academies, and received the Prussian order *Pour le Mérite.* He also was awarded honorary degrees from the Universities of Oxford, Dublin, Edinburgh and Aberdeen. On the death of Mr. Beresford-Hope in 1887, he was returned as one of the representatives in Parliament of Cambridge University, and sat till the session of 1892, but from his retiring disposition seldom took part in debates in the house, though generally voting with the Conservative party. In 1886 he accepted, with the hearty approval of the members, the position of President of the Victoria Institute, in succession to the Earl of Shaftesbury. Nor was this a purely honorary office, for he took a warm interest in the affairs of the Society, and when his engagements at Cambridge permitted, was a regular attendant at the meetings of the Council and of the Institute; coming up to town in all weathers—sometimes at much personal inconvenience—until increasing years and infirmity made it impossible. To his wise counsel and conciliatory bearing the Institute largely owes its present prosperous position; and on several occasions he contributed to its proceedings. Those who were present at the Annual Meeting in 1898, will not soon forget his lucid exposition of the action of light on the organs of the eye, and the marvellous arrangements for the perception of colour.* It was on this occasion that Lord Kelvin gave expression to his admiration for his friend and fellow-worker in the domain of physical investigation when he exclaimed in reference to previous experience, "Whenever we found ourselves in difficulties we said, 'send for Stokes,'" or words to that effect.

Within a year of his decease Stokes was elected Master of Pembroke College, the highest honour it was in the power of the College to confer, and on Sunday, January 4th, 1903, Stokes entered into that "Rest, which remaineth for the people of God," at the good old age of 84 years, having by his great talents and unfailing industry

* Delivered July 18th, 1898.

raised himself from the position of a son of a country clergyman in a remote part of Ireland to the very highest position in the World of Science. That he had an unblemished reputation, and that he was a sincere Christian need not be said. His character was known and read of all men, and of him we may use the words of Longfellow:—

"Lives of great men all remind us
We can make our lives sublime,
And, departing, leave behind us
Footprints on the sands of time;
Footprints that, perhaps, another
Sailing o'er life's solemn main;
Some forlorn and shipwrecked brother
Seeing, shall take heart again."

A Psalm of Life.

The following are the more important communications read before the Institute by its late President:—

Special Address to the Institute. June 18th, 1885.

Annual Address. *Trans. Vict. Inst.*, vol. xx. *Ibid.*, vol. xxii.

"On the Perception of Light," the Annual Address for 1895. *Ibid.*, vol. xxix.

"On the Röntgen Rays," Annual Address for 1896. *Ibid.*, vol. xxx.

"On the Perception of Colour," Annual Address for 1898. *Ibid.*, vol. xxxi.

E. H.

ORDINARY GENERAL MEETING.*

DAVID HOWARD, ESQ., D.L., F.C.S., IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and the following candidates were elected :—

LIFE ASSOCIATE :—Rev. R. Ashington Bullen, M.A., F.G.S.

ASSOCIATES :—Rev. Prof. A. Barton, Ph.D.; George A. Manwaring, Esq., C.E.; Rev. Oswald J. Hogarth, M.A.; Rev. William E. Emmet, M.A.; The Rt. Rev. the Bishop of Honduras, D.D.

The following paper was then read by the author :—

THE BABYLONIAN STORY OF THE CREATION, INCLUDING BEL'S FIGHT WITH THE DRAGON. By THEOPHILUS G. PINCHES, Esq., LL.D., M.R.A.S.

PRELIMINARY STATEMENT.

I HAVE to make a short statement before beginning my paper, partly touching on the delay referred to by the Secretary, but principally to show how it was that I wrote the paper.

Having given a short description of the Creation story of the Babylonians in my book which has just been published—*The Old Testament in the light of the legends and records of Assyria and Babylonia,* I thought it would be a good thing to make a complete translation of the tablets, including the two principal versions of the Creation story. This I began last year and finished it early this year, and here is the result. I then decided that it might, perhaps, be well to write a paper on the subject instead of giving a translation, word for word (as in the book), giving simply a paraphrase.

* Monday, December 1st, 1902.

This I proceeded to do, and wrote rather more than half the paper, *i.e.*, almost the complete story of the Semitic version of the Creation. Then I communicated with Professor Hull, our Secretary, and he said it would be very acceptable to the Institute. Later on, circumstances occurred which caused an interruption of the work, and afterwards it was decided that it was to be read to-day. In the meanwhile another book, containing much new material, had been announced, and I have been waiting for it. I had to go on with my paper to prepare it for this evening, and I found that if I incorporated all I could from that book which was issued only a few days ago, I could not finish my paper. That is the position in which I was placed, and I therefore decided to finish my paper and to ask your indulgence for its not containing an account of all those latest discoveries of which our Secretary has spoken. Those will be inserted in the paper in full, I hope, when it is finally printed in the Journal of the Society* ; but I trust that you will nevertheless find the paper in its present state sufficiently interesting.

MANY years have passed since the late George Smith, who first discovered the nature of the tablets referring to the Creation, published, in his *Chaldean Genesis,* translations of all the inscriptions of the series then known to him, and since that time the study of these tablets has attracted the attention of a large number of students, each of whom has added his quota to the elucidation of the text. Among those who have worked at it may be named the late Fox Talbot, Professors Sayce, Oppert, Delitzsch, Hommel, Jensen, and many others, among whom Professor Zimmern, though one of the last, is not the least, his examination of the text in Gunkel's *Schöpfung und Chaos* having been well received, and attracted much attention.

It is not the intention on the present occasion to traverse all the ground covered by the scholars who have written on this interesting subject, but simply to examine the legend, in its present comparatively complete state, detailing its contents, and stating the results of my own researches, combined with all the essential elucidations of the text by those who have preceded me in the work. Certain other documents bearing on the subject, which have come down to us, will receive special attention.

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* This promise has been duly fulfilled.

The Babylonian Legend of the Creation, as far as it is at present known, is supposed to have been inscribed on seven tablets, each containing as it were a chapter of the work. None of these documents are preserved in a perfect state, but as, in most cases, one or several fragments of duplicates exist, wanting parts can frequently be restored, and the sequence of the narrative is, in consequence, fairly well preserved. The number of the fragments, including the duplicates, amounts to about fifty, and though many of them (there are forty-nine exhibited in the British Museum) come from Assyria—from the royal library of Aššur-banî-âpli at Nineveh—the largest and most solid pieces were found in Babylonia. When in a complete state, these tablets measured probably from 7 to 9 inches long by 3½ or 2½ inches wide, their thickness in the middle being about an inch—more or less. As a rule the obverse or page 1 is flat, whilst the reverse or page 2 is somewhat curved. It will thus be seen that to describe them as "bricks," as is often done, is incorrect. They rather resemble tiles, and were they of the same thickness throughout, this would be a very good name for them. The smaller tablets are very much like cakes of soap, but as those of the Creation series are all large, this description can naturally not apply to them.

As may easily be imagined, the large number of fragments of duplicates implies that this legend was exceedingly popular not only among the Babylonians, but also among the Assyrians, who, speaking the same language as the Babylonians, naturally regarded the literature of "the land of Merodach" as their own. Judging from some of the mythological tablets originating in Assyria, Merodach was generally identified with their national god Aššur, so that the story of the conflict with and the defeat of the Dragon, with the account of the creation of the world, interested both nations equally. As a literary composition, moreover, it is not without its merits, and as it was probably well suited for recitation, the popularity which it enjoyed is not to be wondered at.

The first tablet of the Babylonian story of the Creation, as far as it is preserved, begins as follows:—

I.

"When on high the heavens were unnamed,
Beneath the earth recorded not a name:
The primæval ocean was their producer;
Mummu Tiāmthu was she who begot the whole of them.

The waters in one then united themselves.
The plains were not outlined, marshes were not to be seen.
When none of the gods had come forth,
They bore no name, the fates (had not been determined).
There were produced the gods within the h[eavens?]:
Laḫmu and Laḫamu went forth (as the first ?)
The ages were great (the times were long ?).
Anšara and Kišara were produced over th[em ?]
Long grew the days, extended (was the time of their existence ?)
The god Anu their son . . . .
Anšara, the god Anu . . . .
Nudimmud, whom his fathers begot . . . ."

It is unfortunate that this introductory portion, though completed from different fragments, is so very imperfect Notwithstanding this defect, however, it contains some exceedingly interesting information as to the beliefs of the Babylonians regarding the earliest period of the Creation of the World, and the origin of the gods whom they worshipped. A very noteworthy point about it is, that just this portion has been made known to us by the old Syrian writer, Damascius, who communicates to us its substance in the following words:—

"But the Babylonians, like the rest of the Barbarians, pass over in silence the one principle of the universe, and they constitute two, Tauthé and Apasōn, making Apasōn the husband of Tauthé and denominating her the mother of the gods. And from these proceeds an only-begotten son, Moÿmis, which, I conceive, is no other than the intelligible world proceeding from the two principles. From them, also, another progeny is derived, Daché and Dachos; and again a third, Kissaré and Assōros, from which last three others proceed, Anos, and Illinos, and Aos. And of Aos and Dauké is born a son called Bēlos, who, they say, is the fabricator of the world: the Creator."

It is needless to say that, in this interesting inscription and the Greek paraphrase, we have not only a remarkable parallel account, but also a noteworthy proof of the correctness of the translation, as far as the text is complete, and a proof—if proof be needed—that we have the key to these inscriptions. This proof, it will easily be recognized, lies principally in the likeness in the names, which agree excellently, all things considered. Tiāmthu, or, rather, Tiāwthu, is naturally the Tauthé of Damascius, and means "the sea." Apasōn, her husband, is the Babylonian Apsū, which I have rendered "the primæval ocean," *i.e.*, the waters which were supposed to lie under the earth, later regarded as the abode of Êa, the god of the deep, to whom reference will be made later on. In this part of the legend

there is no real statement that Apasōn was the husband of Tiāmthu, though this may be regarded as implied, and the fact comes out more clearly—though not so clearly as might be wished—in the second tablet. In the succeeding tablets of the series, however, the husband of Tiāmthu bears an entirely different name, but whether this indicate the same or a different mythological personage, is not known.

In Daché and Dachos, it is easy to see that there has been a confusion between the Greek letters Delta and Lambda, which so closely resemble each other. Daché and Dachos should therefore be corrected to Laché and Lachos (as has been often pointed out by the Assyriologists who have preceded me) the Laḫmu and Laḫamu (better Laḫwu and Laḫawu), of the Babylonian text. These deities were the male and female personifications of the heavens, and are mentioned, in the lists, with Anu and Anatu, the god and goddess of the heavens, though in what these two groups of names differed (for they must have differed in some way) is at present uncertain. Anšara and Kišara are the Syrian author's Assōros and Kisaré, the meaning of which, according to the bilingual inscriptions, should be "Host of Heaven" and "Host of Earth" respectively. The three proceeding from them, Ano, Illinos, and Aos, are Anu, the god of the heavens, Ellila, the god Bel in Akkadian (afterwards identified with Merodach), and Aa or Êa, the god of the waters, the deep, and of unsearchable wisdom. This deity was the husband of Damkina (better, perhaps, Dawkina), the Dauké of Damascius. From these last, as he says (and the tablets confirm this statement), Bēlos, *i.e.*, Bel-Merodach, was born, and if this last deity did not "fabricate the world," he at least ordered it anew, after his great fight with the Dragon of Chaos, as we shall see when dealing with the other tablets of the series.

What will in all probability strike many of my audience is the remarkable correctness of the statements of the ancient author whom I have quoted. Evidently he was quoting a document with which he was well acquainted. It forms part of the mass of material contained in his work entitled *Doubts and Solutions of the first Principles.* As this author, who was a Syrian of Damascus, lived at the end of the fifth and the beginning of the sixth century of the present era, the question as to the source of his information is not without interest. It is stated that the well-known temple tower at Borsippa, near Babylon, was as late as the fourth century still a place of Babylonian worship, the old rites and ceremonies being even at

that late date carried on there, and this being the case, it would seem to be by no means improbable that people were in the time of Damascius yet living who were well aware of the teachings of the ancient Babylonians concerning the beginnings of things, and there may have been even professors of their schools of philosophy. With these Damascius probably became acquainted when on his way to or from Persia, or when staying there, he having fled to that country on the closing of the heathen schools of philosophy at Athens by Justinian—Damascius was, in fact, one of the last of their professors.

After describing the creation or production of the gods, comparing their intelligence apparently with that of Tiāmthu and her companions, the narrator goes on to describe the origin of the conflict which took place between the powers of good and evil, as typified by the divine and eternal beings introduced to the reader in the preceding lines. It was at first thought that Tiāmthu herself was the originator of the conflict, but from the fragments recently identified by Mr. King, this would seem to be doubtful, as Apsū (and Mummu) seem to have stirred her up. The first view, however, had some justification, for in more than one place it is stated that it was she who had conceived hatred for the gods her children, and there is no suggestion that her first spouse* and her son were the first instigators. It has also been supposed that the cause of the quarrel was the creation of light, which prevented Apsū from having rest, either by day or by night. For this, however, there is no justification—it was evidently the doings of the gods, whose ways were not the ways of Tiāmthu, Apsū, and Mummu, which caused the desire to bring about their destruction. It would seem that the mother of all things, as Tiāmthu is called, conceived hatred of the gods her children on account of what had been reported to her concerning them, and gathered together all the deities who sided with her. Among these last, strange to say, were some who had been created by the very gods whom she desired to destroy (apparently there were prototypes of the pro-Boers even at the Creation). Storming, planning, chafing, and raging, not resting night nor day, they took up the conflict, and meeting together, "prepared hostility" to those gods whom the Babylonians regarded as the sources of all that is good and noble.

"Mother Ḫubur," as she is in this place poetically named, in the meanwhile busied herself in making preparations to annihilate her descendants, producing irresistible weapons, giant serpents,

* Her second consort, as will be seen further on, was named Kingu.

sharp of tooth, unsparing with their stings, and filled with poison as if it were blood. Fierce dragons then she clothed with terrors, and surrounding them with dazzling splendour, left them on high in order that their monstrous aspect might of itself annihilate those whom she deemed her foes, whilst their towering forms remained undismayed. To these she added other monsters, which may be rendered tentatively by the expressions cockatrice and basilisk, and there were likewise some which resembled in form the god of the heavens, Laḫamu, with other great monsters, raging dogs, and scorpion-men. Then there were certain swift-moving monsters, fish-men, and mountain-rams. All these wielded unsparing weapons, and feared not the conflict, being pledged to obey her powerful, irresistible commands. Altogether, the number of the different kinds of monsters which she created was eleven.

These were naturally quite independent of the gods, some of whom were her offspring, and who, it is noteworthy, are described as her firstborn. These, too, prepared for the fray, and over them she set Kingu, whom "she made great among them, (among) those going in front before the army (as) leaders of the host," who excited their followers to the strife. Having delivered the chief leadership into Kingu's hand, and set him on the rampart, she is represented as reminding him how she had set firm his word, and made him great in the assembly of the gods, delivering the rule of the gods, "all of them," into his hand. She exhorts him then to be "exceeding great," and, apparently as an additional inducement to act up to his exalted position, she calls him "her only spouse." Delivering to him the "Tablets of Fate," which she places in his breast, she informs him that, for the future, his command shall not be changed, and shall stand firm—a power which was apparently regarded as due to the possession of the documents in question. "Now," continues the Babylonian bard, "is Kingu raised on high, assuming Anu's dignity, among the gods (who are) her sons, he holdeth the command." This apparently means, in other words, that the position now occupied by Kingu among the powers of evil, was similar to that of Anu among the gods of heaven, and that he would occupy this place in the case of Tiāmthu's success. Kingu now seems to address to his followers a short exhortation to act valiantly—to be fearful in the fight, and let resistance be laid low. But the passage is a difficult one, and the meaning of the lines therefore not altogether certain.

At this point the first tablet of the Semitic Babylonian legend of the Creation comes to an end, and from the parallel passages

of the other inscriptions we see that the account of the revolt of Tiāmthu and her followers also terminated here. It is an appropriate place for the conclusion of the first chapter.

II.

Naturally these preparations could not long be kept secret from the gods, and Êa, the wise one among them, was the first to hear about it, and it was he who carried the news of the revolt of Tiāmthu and her followers to his father Anšara, the deity apparently representing the heavenly host, and to his divine companions. The succeeding lines of the tablet therefore give the words of the messenger in announcing his news, and he tells the whole history of the uprising of the goddess of the watery waste exactly as it is related in the first tablet. Though such repetitions are exceedingly tedious, especially when at such length, they nevertheless serve to carry on the narrative, and their variants enable us to control the text, and sometimes form a valuable aid in explaining it.

Having heard what had taken place, Anšara gave way to despair, striking his breast and biting his lips (such is the restoration suggested here). With a loud cry, he called out to Anu, his son, whom he urges to join him in resisting the enemy; and judging from what remains, Anu is instructed to attack Apsū, the son of Tiāmthu, whilst Anšara occupies herself with the mother. For this restoration of the passage, however, I am not responsible, the rendering here adopted being that of Delitzsch and Jensen; and there is no doubt that the suggestions of these scholars are at least very probable.*

A gap occurs here, after which another fragment takes up the story, and from this piece it would seem that, in the end, it was decided that Anu should undertake the task of defeating the Dragon alone. The conversation between Anšara and Anu apparently ends with a final word of instruction, in which the latter is told to speak to her, giving the message of them both, so that, should she be defiant, and not hear his voice (at first), she might at least be appeased afterwards. Anu then set out, but seeing Tiāmthu's snarling face, and finding himself powerless to do anything against her, he turned back and reported his non-success to his father Anšara.

* King has a different rendering, but as the text is defective, I allow the above to remain for the present.

At this point there is a further gap in the story, but it is clear, from the context, that another deity, namely, Nudimmud (the god Aê), likewise undertook the task of defeating her, but was not more successful than Anu. The heavenly powers then decided to ask Merodach to be their "avenger," as the legend has it. This commission was at once accepted with eagerness by the chief of the Babylonian pantheon, as the fragment referring to this portion of the legend indicates:

"Rejoiced then the Lord at the word of his father—
His heart was glad, and to his father he said:
'Lord of the gods, fate of the great gods,
If then I (am to be) your avenger—
(If) I bind Tiāmthu, and save you.
Convene an assembly, cause to be great, and proclaim ye, my fate.
In Upšukenaku sit ye then joyfully together, and
When my mouth opens, let me, like you, the fates decide;
(Then) whatever I do, even I, shall not be changed—
Let the utterance of my lips nor turned nor altered be.'"

Here Merodach is represented as receiving his commission joyfully, but, whilst accepting, asking for a reward, as if of opinion that the gods would be under an obligation to him—as is, in fact, implied farther on, where Anšara is spoken of as having sent Merodach, or having urged him to undertake the task. There is then no doubt as to how the championship of Merodach was thought to originate.

This time, fortunately, there is no gap in the text, the lines translated above being the last of the second tablet, the third following immediately on.

III.

Without wasting time in words of thanks or rejoicing, Anšara immediately gives instructions to his messenger Gaga to go to Laḫmu and Laḫamu, the two deities of the heavens, to invite all the gods to a feast in the place of assembly (Upšukenaku), where, having eaten bread and prepared the wine, they may decide the fate "for Merodach their avenger." The words of the message are then given, Gaga being told to say to Laḫmu and Laḫamu that Anšara, their son, had despatched him to announce to them the desire of his heart; the description of Tiāmthu's revolt, and the preparations which she had made for her conflict with the gods being then repeated in the same words as in the first tablet, where the story of her iniquities is introduced. Two lines suffice, however, to relate the powerlessness

of Anu and the fear of Nudimmud (the god Êa) in the presence of the terrible foe. Then comes the request made to Merodach, and his answer, also given in the original terms. Having received this long message:

"Gaga went, he betook himself to his path,
In the place of Laḫmu and Laḫamu, the gods his fathers,
He stood, and kissed the ground beneath them—
He advanced, stood still, and spoke to them."

Here follows again the whole of Anšara's message, with which Gaga, the divine messenger, had been intrusted—Tiāmthu, her revolt, Anu's failure, Nudimmud's fear, the request made to Merodach, and the answer of the last named. In fact, this portion of the legend reminds one, in a measure, of a certain classic of our youth, though on a lengthier scale.

On hearing the account of the danger which threatened the gods, Laḫmu and Laḫamu cried aloud, and all the Igigi, or gods of the heavens, groaned bitterly, announcing, at the same time, their inability to understand Tiāmthu's acts. The great gods, all of them, then went to Anšara's place, where the feast was to be held. There they "made tongue," whatever that may mean—perhaps it signifies that they discussed the matter, and having eaten wheaten bread and prepared the wine, that sweet must which was to do away their sadness and refresh their minds and bodies:

"For Merodach, their avenger, they decided the fate."

And with these words the third tablet—or chapter, if that be thought a good alternative term—ends.

IV.

We now come to the fourth tablet, which, after the first, is one of the most interesting. In this the honours which were conferred upon Merodach by the other gods—"the gods his fathers"—are recounted. They founded for him a princely chamber, and he stood there to rule "in the presence of his fathers." The gods then address him in the following words:—

"Thou art now the honoured one among the great gods,
Thy destiny is without rival, thy command is (that of) Anu.
Merodach, thou art the honoured one among the great gods,
Thy destiny is without rival, thy command is (that of) Anu.

From to-day shall thy command not be changed,
To raise and abase, let it be thy hand
Let the utterance of thy mouth stand firm, unfailing (be) thy command.
None among the gods thy boundary shall cross;
Care is the requirement of the chamber(s) of the gods, so
May thy place be the place of their desire.
Merodach, thou art our avenger,
We have given thee the dominion—the universe of all complete:
Sit (?) then in the assembly, let thy command be high;
May thy weapon not fail, may it destroy thine enemy.
O Lord, who trusts in thee, protect thou his life;
And he who takes up evil things, pour thou his life away."

They then set a garment in their midst, and telling Merodach that destruction and creation were in his power, asked him to speak, commanding its destruction, and to address it again, commanding its re-creation. This he did:

"He spoke then with his mouth, the garment was destroyed;
He spoke to it again, and the garment was reproduced."

Having thus tested his powers successfully, the gods rejoiced, and did him homage, saying "Merodach is king." They then transferred to him sceptre, throne, and emblem of reign, and giving him an unsurpassed weapon, "destroying those who hate," they said:

"Come then, cut off the life of Tiāmthu,
Let the wind carry her blood into hidden places!"

"Thus," the record continues, "did the gods, his fathers, fix the fate of Bel—a path of peace and goodwill they caused him to take as his road."

Then began Merodach to arm himself for the fray, testing (so it would seem) his spear or dart, raising the divine weapon, which he placed at his right, and hanging his bow and quiver at his side. In addition to these, he set the lightning before him, the well-known emblem and weapon of thundering Jove, whose Babylonian original and counterpart he was; and moreover he filled his body with flashing flame, or, if another rendering be preferred, with the darting thunderbolt. Not least in his plentiful armoury, however, was the net which he had made wherewith to catch the great enemy of the gods, who, in the place where this is referred to, has an addition to her name, to wit, *kirbiš*, which seems to mean "in the midst," referring, apparently, to her dwelling under the earth. This net (which practically proves the identity of Merodach with Nimrod, "The mighty hunter" or "trapper" of Gen. x, 9) is described as having been held by the four winds, whom (as they

are practically personified, we may use this pronoun) he also employed to bring the net, which was the gift of his father Anu, the god of the heavens. Other winds—"the hurricane (an evil wind), the storm, the gale, the four(fold) wind, the seven(fold) wind, the troubling (?) wind, the uncontrollable wind,"—seven in all, are described as having been made by him to be his helpers, and these, rising behind him to confuse Kirbiš-Tiãmthu, he took with him. Another of his means of defence was "the storm-flood, his great weapon," but no clue as to the way in which he made use of this appears in the legend.

Having thus prepared for the fray, he mounted his irresistible and terrifying chariot, with its fourfold yoke of steeds "unsparing, sweeping down, swift of flight, sharp of tooth, poison-bearing," such as knew how to overthrow and to dash aside, not fearing battle, dreadful in resistance, attacking right and left, and exceedingly steadfast. Nor did Merodach forget his own appearance. He covered himself with the cloak of his dreadful majesty, and placed his overwhelming brilliance on his head. Being now ready, he sallied forth to meet the foe, breathing defiance, grasping in his hand, as Jensen has it, the plant of incantation, for evidently he wished to leave no stone unturned in the accomplishment of his task.

"In that day they clustered around him, the gods clustered around him—
The gods his fathers clustered around him, they clustered around him.
Then the lord advanced, the retreat of Tiãmthu closely regarding,
Noting the snarling of Kingu, her spouse.
But whilst he looked, his mind (?) was troubled,
His understanding cast down, and his intention wavered;
And the gods, his helpers, who went by his side,
Saw their leader's confusion—their glance was troubled too."

Tiãmthu, Merodach's opponent, stood firm and defiant, simply uttering words to all appearance scornful, but the mutilation of this passage does no more than enable one to surmise that she regarded them all—Merodach as well as his fathers—as rebels or conspirators. In his turn the god makes answer to the effect that she who was great and exalted had rebelled against the gods, raising Kingu to be her consort, giving him command of the "heavenly ones," and seeking and setting evil against the gods of his fathers. Telling her to gather her host together, and bind on her weapons, he ends with the challenge:

"Stand then—I and thou, let us make battle together!"

Furious, shouting wildly, trembling with rage, uttering incantations and charms, whilst the gods of battle called upon their weapons not to fail them, Tiãmthu and the wise one of the

gods, Merodach, stood forward for the conflict and approached to do battle. At once Merodach spread forth his net, and caused it to enclose her, sending forth the evil wind which followed behind him. At that moment Tiāmthu opened her mouth, and before she could close it, the wind entered, so that she could not shut her lips. The angry winds filled out her body, her heart was overpowered, and she lay with open mouth deprived of strength. With his spear then he killed her, cut asunder her body, split her open, cut out her heart, and overcame her. Her life having been destroyed, he threw her down, and stood upon her prostrate corpse. Next came the turn of her helpers, whose force was scattered and sundered, and the gods going by her side—apparently those sons of Anu who had joined her—turned and fled, each seeking to save his life. They found themselves surrounded, however, by an enclosure, unable to flee, and the god who had conquered their leader then shut them in, and broke their weapons. Being thrown into the net, and sitting in bonds, their groaning filled all the region where they were, and they found themselves obliged to bear the anger of Merodach, shut up in prison.

After this came the turn of the eleven beings whom Tiāmthu had created, and made so terrible—the troop of devils, as the original seems to say, going by her side. These Merodach set in bonds, deprived of their power, and trampled beneath him. Lastly, he is represented as turning his attention to Kingu, the spouse of Tiāmthu, who, having been bound, was reckoned worthy to be the peer of Ugga, the god of death. Like unto the moment when Merodach overcame Tiāmthu, this also was a period of supreme triumph to the god of heaven, for at last he was able to gain possession of the things which he desired above all, namely, the tablets of Fate, which Tiāmthu had given to Kingu. These now being in his hands, he pressed his seal upon them, and grasped them to his breast.

"After he had captured and overthrown his opponent,
The dreadful foe he completely (?) rooted out (?).
He set up the power of Anšara over the enemy completely,
And the mighty Merodach attained Nudimmud's desire.
Over the conquered gods be strengthened then his hold,
Returned against Tiāmthu, whom captive he had made.
Trampled then the lord upon Tiāmthu's breast (?),
With his unsparing weapon cleft he then her skull,
Cut through the veins of her blood,
And caused the north wind to carry it away to secret places.
When his fathers saw him, they rejoiced, and were glad,
And caused gifts and offerings to be brought to him, even to him.

Rested then the lord, looking upon her corpse ;
He divided her trunk (?), making therewith clever things.
He sundered her then, like a divided (?) fish, into two parts.
Half of her he placed, and covered therewith the heavens,
Pushed the bolt, set a watchman (there) :
Her waters, those are not to be allowed to come forth, he bade.
He traversed the heavens, examined the places, and
Set the Abyss in front, the abode of Nudimmud.
Then measured the lord the Abyss's extent :
An edifice in its likeness he set—Ê-šarra.
The edifice Ê-šarra, which he built, is the heavens :
(As for) Anu, Bel, and Êa, he founded their strongholds."

Thus, according to the legend, did Merodach, who was called Bel, "the lord," attain to the position of king over the gods, who, though throughout called "his fathers," are represented as willingly consenting to be ruled by their son. This, as will be seen farther on, has a certain amount of importance, not only for the question of the composition of the poem, but also for the history of the Babylonian religion, upon which point—a point of exceeding interest—I shall touch, in the course of the present paper. Fortunately, the tablet above translated is one of the most complete of the series ; and it is well that it is so, for this portion of the story, with its fulness of incident and detail, contains many important and interesting facts, some of them closely connected with religious thought even during the Christian era.

V.

The fifth tablet of the series continues the account of Merodach's acts after the destruction of Tiāmthu, when he began his work of ordering the world anew.

He erected the stations of the great gods, whose emblems are the stars; he set the Zodiac, designated the year, outlined the constellations, giving to each of the twelve months three stars, or, rather, groups—thirty-six in all, "from the day when the year begins"—that is, from the month Nisan (March-April), and these were to be for signs, for such was one of the uses of the heavenly bodies, as is expressly stated in the first chapter of Genesis. Next

"He founded the station of Nîbiru, to make known their limit,
That none might err, nor go astray."

Nîbiru means "the traverser," and has been identified by Jensen with the planet Jupiter, Merodach's own star, and so

called by the nations of the ancient world on that account, for Jove and Merodach, as is well known, are one and the same, the former being his western, and the latter his eastern name. As Merodach was king of the gods, so was Jupiter, the planet, the overseer of the stars, traversing and crossing the heavens from end to end, and preventing them from leaving their paths or their stations in the celestial vault.

His next work, according to the tablet, was to place with his own the stations of Bel and Êa, with the great gates on both sides, and the bolts right and left, the zenith (such seems to be the meaning of the word) being set between. To all appearance this is a description of the heavens according to the ideas of the Babylonians, who thought of the great blue vault as possessing these things; for through the doors which were opened for this at the beginning of each day, the sun came forth, "as a bridegroom coming out of his chamber, who rejoiceth as a strong man to run his course." According to the hymn to the setting sun which was chanted at the Birs Nimroud, anciently called Ê-zida, and identified by tradition with the tower of Babel, the spouse of the sungod went to meet her lord at the close of the day, and the doors and the bolts of the high heavens gave him greeting, thus verifying what is stated in the Semitic Babylonian story of the Creation at this point with regard to the arrangement of the heavens in Babylonian cosmology.

First among the remaining heavenly bodies is mentioned the moon, in this place called Nannaru, which was caused to shine forth, and ruled the night. He was set as an adornment of the night, to make known the days (*i.e.*, the festivals and divisions of time). Monthly, without ceasing, he was provided with a crown, an expression which probably means that he appeared in the form of a narrow crescent. Appearing in the land at the beginning of the month, the horns are described as shining forth to make known the seasons, and the crown is said to be perfected on the seventh day, when the crescent, having become a half-disc, no longer had the form which the Babylonians were accustomed to regard as a crown. Considerable doubt exists as to the real meaning of the lines which follow, the inscription being very imperfect at this point, but there seems—merely seems—to be a reference to the luminary being full when opposite the sun, and if this be the case, there is just the possibility that the Babylonians had noticed that the moon shone with light borrowed from the sun.

In this place, after an interval, Professor Jensen inserts a fragment which may well belong to this series. It seems, on

the obverse, to refer to the temple Ê-sagila (probably the heavenly fane of that name), and afterwards speaks of Merodach's net and his bow, the cunning work of which the gods admired. Anu, the god of the heavens, taking up the bow, kissed it, and proclaimed its names, "the long wood," and "the star of the bow," fixing it afterwards in the heavens (which were his special domain), apparently under that name. It is not improbable that this is simply inserted in the legend to explain the name of the constellation of the Bow, which occurs in the list of the thirty-six constellations to which reference has already been made. After speaking of the setting of a throne, the fragment breaks off.

Another broken piece which is supposed to come in here seems to refer to the frothy foam of Ti(āmthu), but in what connection, does not appear. Farther on, the god Anšara speaks to the winds, evidently appointing them to their several places. After this, there is apparently a mention of the cutting through of the nostrils of Tiāmthu, to pouring out, and to water-springs, probably a symbolical explanation of some natural phenomenon or other.

The lines which follow refer to the troop (?) of the Abyss, and give a conversation concerning Anšara, who, as one of the gods of the heavens (his name means "the heaven-host"), speaks, seemingly, of the construction of the upper Abyss, opposite Ê-šarra, as his work, and announces the production of other things—a house and a citadel, probably in the Abyss. After this, "constant lamentation" is twice referred to, and it may be guessed that this was described as proceeding from the followers of Tiāmthu, and it is not impossible that this portion of the legend was devoted to the description of the provisions made for their safe keeping. Next the things created by a deity whose name is wanting, but who was probably this same Anšara, are spoken of. Of special interest in this part is the line referring to the city of Aššur, here indicated by the characters *Bala-sumun*, with the prefix for city, the whole meaning, as indicated by Delitzsch long ago, "the city of the old realm," or "government." It will easily be recognized that the mention of the city Aššur in connection with Anšara is most natural, the name of the god being written with the same characters as that of the Assyrian god Aššur. A further confirmation of the identity of the two names is furnished by Damascius, who does not write the name of Anšara as Ansaros or Assaros, but as Assōros, with *ō* instead of *a*. Evidently there was a tendency to pronounce Anšara as Assōra or Assōr, the

close similarity of which to Aššur (Asshur) is evident. Should these inferences turn out to be correct—and there is every probability that they are so—then the reading of the Authorized Version for Gen. x, 11, "Out of that land went forth Asshur," and not "He (Nimrod) went out into Assyria," is the only possible rendering, as it seems, in fact, to be the more reasonable.

VI.

The following is the translation of the beginning of the sixth tablet, published by Mr. King a few days before this paper was read, and referred to on that occasion, though the translation was withheld until the final preparation of the paper for press:—

"Merodach, on hearing the words of the gods,
[Is] moved in his heart to make [cunning things ?]
[He ope]ned his mouth, [saying] to [his father] Aê—
That which he thought in his heart he imparted to him :—
Let me gather my blood, let me . . . . . . bone ;
Let me then set up a man, let the man . . . . . .
Let me create then a man, dwelling . . . . . .
May the service (or work) of the gods be established, and (as for) them, may they [construct ?] the shri[nes].
Let me alter then the ways of the gods, let me chan[ge their paths ?],
As one may they be honoured, and to the two may . . . . . ."

Here the speech of Merodach ends, and fragments of the answer of Aê, too defective to allow any connected sense to be made out, appear. This is unfortunate, as the text, if better preserved at this point, would undoubtedly have rendered what remains of the opening lines more comprehensible. Such as it is, however, it is a welcome addition to the legend, and it is to be expected that this portion will receive sooner or later such supplementary matter as will give it its full value.

The story of the creation of man by Merodach, from hi own blood, is one of the most interesting of the statements concerning the god, though there is apparently but little in it which bears upon the creation of man as detailed in the first two chapters of Genesis. It confirms, on the other hand, in a most satisfactory way, the statements on the subject made by Berosus, who, as priest of Belus (Bel-Merodach), must have been well acquainted with all the teaching of his predecessors and contemporaries upon the subject. As will be remembered, the Babylonian writer (after the description of the destruction

of the woman Tiâwthu) states that the deity (Belus) cut off his own head; upon which the other gods mixed the blood, as it gushed out, with the earth; and from that men were formed; and it is on account of this that men are rational, and partake of divine knowledge. After this Belus divided the light from the darkness, separated the heavens from the earth, and reduced the universe to order. But the animals so recently created, not being able to bear the prevalence of light, died.

All the inhabitants of the world being thus destroyed, other men and animals were again formed from the blood of Belus mixed with earth, in much the same way as the first creation. These were able to bear the light. There is hardly any doubt that some allegorical signification lies in this, light not only standing for the physical rays from the sun by which things are made visible to us, but also for enlightenment and its kindred ideas, including religious fervour, which causes men to turn to their creator in worship. There is probably in these two creations some analogy to the "sons of god" and the "daughters of men" in the sixth chapter of Genesis, the former standing for the good and pious, and the latter for the indifferent or evil. The completion of the legend will be looked forward to by all, in the hope that further confirmations may result. The reference to "bone," which occurs in the Semitic Babylonian legend at this point, and its possible analogy with the description of the creation of Eve, I leave for future consideration. The text is at present too imperfect.

According to the copy published, this sixth tablet of the series contained 146 lines, of which, however, only those at the beginning and portions of the last eight are preserved. The latter refer to the further honours conferred upon Merodach by the gods.

VII.

There was some doubt as to whether the tablet, now known to have been entitled "The Tablet of the 51 names," formed part of the Creation-series or not, but the catch-line at the end of the sixth tablet seems to prove that the opinion of G. Smith and all who have written upon the subject of the Babylonian legend after him was correct upon this point. This interesting text is a list of the names conferred by the gods upon Merodach as the creator. As we know from other inscriptions, the name of this deity expressing best his character of originator of all things is Tutu, a word in which a mystic charm was to all appearance regarded as residing. In con-

sequence of this, it is placed on the left-hand edge of some of the copies of the seventh tablet of the series, at the head of certain of the paragraphs.

In a list of divine names, many or all of which are Merodach's, we find the explanation of this mystic reduplicate word, namely, *mullid îlâni, muddiš îlâni*, "begetter of the gods, renewer of the gods," showing clearly in what way the ancient Babylonians thought of him. How Merodach, who is described in the earlier tablets of the Creation-legend itself as a descendant of the god Anu, grandson of the older Bel, and son of Aê, could be the creator of the gods, is difficult to explain. Perhaps this etymology of Tutu rests upon a play upon words, the Sumerian *utu* or *tu*, which are apparently shortened forms of *utudda* or *tudda*, meaning, according to the bilingual lists, "to bring forth," "to beget." The ordinary meaning of Tutu, however, as a reduplicate of the root *tu*, is "to cross," and this may, in fact, be the real meaning, one of the names of Merodach, as the planet Jupiter, being (as we have seen) Nibiru, "the traverser," so called, according to Jensen, on account of his movements upon the ecliptic. As the tablet says, he was to control the paths of the stars of heaven, and pasture (or, perhaps, shepherd) the stars, all of them, like sheep.

The following is a rendering of the principal part of this tablet, and will serve to show the style of the composition:—

"Asari, bestower of planting, [institutor of irrigation (?)],
Who has created grain and plants, causing [verdure to grow].
Asari-alim, who in the house of counsel is honoured, [who increaseth counsel]—
The gods pay him homage, fe[ar besetteth them].
Asari-alim-nunna, the princely one, light of the [father who begot him],
Director of the decrees of Anu, Bel, [and Aê];
He is their patron, the announcer of . . . . . .
Who maketh its* adornment, abundance, to grow . . . .
Tutu, the maker of their renewal, [is he];
May he purify their desires, and as for them, let them [be at ease];
Let him make then the incantation, may the gods [be at rest].
Angrily have they arisen, let him restrain [their opposition].†
Verily he has been made high in the assembly of the gods . . . . . .
None among the gods shall [forsake him].
Tutu (is) Zi-ukkina, the life of the people‡ [of the] gods.
Who set for the gods the glorious heavens.
Their paths they took, they instituted . . . .§
May the deeds [which he performed] not be forgotten among men.
Tutu Zi-azaga, thirdly, they called—the possessor of purification.

* Or "his." † Lit. "their breast." ‡ Or "host."
§ Or "He instituted their way, he ordained [their path ?]."

Lord of the good wind (? inspiration), lord of obedience and favour,
Creator of fulness and plenty, institutor of abundance,
He who changes small things to great.
In our dire need we scented his sweet breath—
Let (men) speak, let them glorify, let them do him homage.
Tutu (is) Aga-azaga, fourthly. May he make the crowns glorious,
The lord of the glorious incantation bringing the dead to life,
He who had mercy on the gods who had been overpowered,
Who made heavy the yoke laid on the gods his enemies,
For their redemption created mankind.
The merciful one, he with whom is the giving of life,
May his word be established, and not forgotten,
In the mouth of the black-headed ones* whom his hands have made.
Tutu (is) Mu-azaga, fifthly. May their mouth make known his glorious incantation,
Him who with his glorious charm rooteth out all the evil ones.
Ša-zu—he who knoweth the heart of the gods, who looketh at the inward parts,
He who letteth not evil-doers go forth against him,
He who assembleth the gods, who appeaseth their hearts,
He who subdueth the disobedient, ...
He who directeth righteousness and justice . . . . . .
Who setteth aside injustice, ...
Tutu (is) Zi-si, he who bringeth about silence . . . . . .
He who sendeth forth the stillness, ...
Tutu (is) Suḫ-kur, annihilator of the enemy, ...
Dissolver of their agreements, ...
Annihilator of everything evil . . . . . ."

Here the obverse breaks off, and there is a gap of several lines, after which the inscription is continued on the reverse:—

". . . the constellation . . . (which shineth forth in the heavens)
Then seized he the back part of the head, which he pierced (?)
And as Kirbiš-Tiâmthu he circumvented restlessly,
Let his name be Nîbiru, the seizer of Kirbišu.
The paths of the stars of heaven let him control,
Let him pasture like sheep the stars, all of them.
Let him confine Tiâmthu, bring her life into pain and anguish.
In man's remote ages, in lateness of days,
Let him arise, and he shall not cease, let him continue (?) to the future.
As he made the (heavenly) place, and formed the firm (ground).
Father Bel called his name 'Lord of the world,'
The appellation (by which the Igigi, all of them, call him),
Aê heard, and he rejoiced in his heart,
Thus (he spake): 'He, whose renowned name his fathers have so glorified,
Shall be like me, and Aê shall be his name.
The total of my commands, all of them, let him possess, and
The whole of my pronouncements let him, (even) him, make known.'
By the appellation 'Fifty' the great gods

* Mankind, or the Semitic and Sumerian races.

Proclaimed his fifty names, and they caused his career to be great (beyond all).
May they be accepted, and may the primæval one make (them) known,
May the wise and the understanding together well consider (them),
May the father repeat and teach (them) to the son,
May they open the ears of the shepherd and the leader.
May they rejoice for the lord of the gods, Merodach,
May his land bear in plenty, and as for him, may he have peace.
Firm is his word, unchanging is his command—
No god hath yet made to fail that which cometh forth from his mouth.
If he frown down in displeasure, he turneth not his neck;
In his anger, there is no god who can withstand his wrath.
Wide is his heart, vast is the kindness of his . . . .
The sinner and evildoer before him are (ashamed?)."

A duplicate gives the remains of four lines which seem to have differed from the corresponding portion of the principal tablet here translated. These are couched in the same strain as the portions of the final tablet of the series which are preserved, and it may therefore be supposed that the remainder of this inscription, if we possessed it, would end with a poetical climax similar in form to the lines translated here.

It is unnecessary to refer to the literary form and merit of this portion of the composition (especially the obverse), that being self-evident. Perhaps the writer noticed how monotonous his long poetical narrative was, and varied it by introducing the Sumerian forms of the names bestowed upon Merodach, with a free translation, and expansions of the idea contained in them. I have said that the translation of these names of Merodach into Semitic Babylonian is very free, and this will easily be recognized by anyone acquainted with the two languages. Thus, though Zi-ukkina might easily be translated "the life of the universe," or, rather, "of the people," Zi-azaga cannot by any possibility be regarded as meaning "the possessor of purification," any more than Aga-azaga can mean "May he make the crowns glorious." There is, therefore, hardly any doubt that the names given to him mean "the pure life," "the glorious crown," "the glorious incantation," "heart-knowing," "the silent life," "annihilator of the enemy." Perhaps, however, they are not intended as translations at all, but merely as amplifications of the ideas contained in the names, which are to all appearance mystic, and connected with the character attributed to Merodach. As he had saved the world from destruction at the hands of Tiāmthu, giving it thereby new life, he was "the life of the universe," and as he, compared with her and her followers, was everything that was pure and holy, so he was "the pure life" for all to imitate.

What "the glorious crown" refers to is doubtful, but there is every probability that Merodach is so named as the desire of all the faithful among his worshippers, who, on leaving this life, would go forth from earth to live with him. "The glorious incantation is easier to comprehend, Merodach being the lord of all such things, and one of them had, in the words of the text, rooted out all the evil ones. Just as the god Ninip is called "the supreme word," so Merodach could be called in a similar way "the glorious incantation," because of the efficacy of that which he had uttered when attacking Tiâmthu. What "the silent life" or "spirit of silence" (either may be the translation of Zi-si) refers to is not known, but the completion of the inscription (when that happens) will probably make this clear to us. "The annihilator of the enemy" needs no explanation, as it is evident that Tiâmthu is referred to. She, with her helpers, was the type of all evil, and it is doubtless his triumph over them which caused this name to be given to him.

With regard to the rest of the inscription of this last tablet of the series, it is noteworthy that Merodach is said to have seized Tiâmthu by the back part of the head, a statement which seems to differ from the account of her destruction in the earlier part of the legend. His creation of heaven and earth is also spoken of, but chiefest of all would seem to have been the formation of mankind, either in the room of the rebellious gods, or in lasting remembrance of their evil-doing. Throughout this part, the gratitude due to him, his mercy and goodness, his glory in having overcome the source of evil, and his renown in after ages among men on account of his glorious deeds, are the points especially touched upon. It is noteworthy that also here, as in the preceding tablets of the legend, the fixity of his word, the changelessness of his command, and the powerlessness of the other gods against him with regard to these things, are again stated. Worthy of special attention is also the statement that the other deities called Merodach by their own names, thereby conferring upon him, at the same time, their attributes, and making him as it were participator in their being. Whilst, therefore, he was the manifestation of the whole of them collectively, they were at the same time individually manifestations of him, as other tablets of a religious nature from Babylonia abundantly prove.

VIII.

In the absence of the account of the creation of man and the

beasts of the earth in the Semitic account of the Creation, of which an outline has just been given, this is probably the place to refer to the bilingual version, of which I published translations in 1890 and 1891.

The second text is of an entirely different nature, bringing the work of creation before us with the intention of showing how, among other things, the great and holy cities of Babylonia came into existence; and in this the origin of evil, as typified by the dragon of Chaos, and its destruction, are left entirely aside. If we may judge from one of the omen-tablets, it was the custom among the Babylonians to make pilgrimages to the holy places of the land, with the expectation of obtaining benefit therefrom, and there is no doubt that the cities founded by Merodach, and mentioned in this inscription, namely, Babylon, Erech and Ur, with Êridu, were classed as the chief among them. It is apparently on this account that the bilingual story of the Creation was written, for it is nothing more nor less than the introduction to an incantation, in which the temple of Nebo at Borsippa, now called the Birs-Nimroud, and generally identified with the tower of Babel, is poetically spoken of in a way which suggests that the writer of this text wished it to be regarded as of equal importance with the great shrines and cities created by Merodach, or existing from the period of the gods before him.

It begins with a reference to the time when the glorious house of the gods (apparently the heavens) had not been made, a plant had not been brought forth, and a tree had not been created; when a brick had not been laid, a beam not shaped, a house not built, a city not constructed, and no human site had been formed. Niffer and its temple-tower Ê-kura, Erech and its temple-tower Ê-ana, the abyss or waters under the earth, and Êridu, "the good city," and the glorious seat of the house of the gods, had also not been made, and "the whole of the lands were sea." When within the sea there was a stream, at that time Êridu was formed, Ê-sagila, "the lofty-headed house," was constructed—Ê-sagila, which the god Lugal-du-azaga, "the lord of the glorious abode," had founded within the abyss. Then, too, the city of Babylon, and the earthly Ê-sagila within it, were completed; and in connection with this it is worthy of note that the word used allows it to be inferred that this fane, which Nebuchadnezzar calls "the tower of Babylon," had been begun at an earlier date, but that the work had been interrupted. The word "completed," however, may be simply due to the desire not to use the same expression too often.

It is at this point there is a reference, for the first time, to the creation of living things—not animals or men, but beings of a much higher station, namely, the gods and the Annunaki, who were made by a being unnamed, though it may be inferred that their creator was possibly the Lugal-du-azaga mentioned before in the text. The same deity (apparently) then "proclaimed as supreme the glorious city, the seat of the joy of their hearts." The god Merodach (whose name here appears for the first time in the narrative) now bound together a foundation before the waters, made soil (*êpiri ibnî*), and poured it out with the foundation, in order that the gods might have a dwelling which should satisfy their hearts.

Up to this point the narrative relates to the earth, the Abyss, and the gods, but here a change comes in, introduced by the single line, "He made mankind," which is followed by the addition: "The goddess Aruru made the seed of mankind with him." After this he made the beasts of the field and the living creatures of the plain, set the Tigris and the Euphrates in their places, and "proclaimed their name well"—a phrase which recalls that of Genesis, "and God saw that it was good." The deity (it is apparently still Merodach who is referred to) then created grass, the plants of the marshes and the forests, the verdure of the plain, land, marsh, and thicket-grown tracts. This was followed by the creation of oxen and other large cattle, with sheep, and the meadows and thickets where they fed or dwelt. "Lord Merodach" then raised a bank (lit. "filled a filling") on the sea-shore, produced water-plants and the place where they grow, and the things mentioned in the first few lines as being non-existent were then made by him—plants and trees, bricks and beams, houses and cities; Niffer and its temple Ê-kura, Erech and its temple Ê-ana.

There are many details of this inscription which are of interest, but it is impossible to touch upon them all in the compass of a single paper. It would be important, for instance, to know whether Merodach was the creator, not only of men and things of the earth, but of the gods and the Annunaki, or "spirits of the earth" as well, as the lists of gods indicate was the belief. Noteworthy is the fact, that nothing existed until "there was a stream" or "current within the sea," pointing also in this version to the belief that the existence of life was somehow connected with the presence of water. At this time Êridu, the Paradise of the Babylonians, was made, and Ê-sagila, which the god Lugal-du-azaga had founded within the Abyss. As Lugal-du-azaga

—the name means "the king of the glorious abode" was one of the names of the god Aê, Merodach's father, it is clear that he, and the "glorious Abode" over which he ruled, were not created by Merodach. But if this be the case, then Babylon, Merodach's own city, is in the same doubtful position. As it is certain that he was regarded as the founder of the city—there is no record of its existence being due to his father Aê, and it was, moreover, the beginning of Nimrod's (*i.e.*, Merodach's) kingdom—it would seem likely that the whole narrative is purposely invested with doubt in order to lead the reader to suppose that even the things about which no statement is made were the work of Merodach, as Babylon and the other cities of Babylonia, in the legends of the country, certainly were.

The way in which Merodach made mankind is not described—there is mention only of the simple fact, that Aruru, the goddess of Sippar, made the seed of mankind with him. As the reference to this goddess comes in rather suddenly here, it is probable that the line was inserted simply because the inscription was a copy made for the city of Sippar, and just as Aššur-banî-âpli had his own name inscribed in at least one bilingual inscription, and his scribes left out the references to Isin and Larag or Larancha in "the Lament of the Daughter of Bel," in like manner also this text may have been edited by the scribe who wrote it out; the name of Aruru, who, possibly according to some legend of the city, had made the seed of mankind at the creation, being inserted here to fill up what he may have considered a regrettable omission.

The incantation on the reverse, which calls down all kinds of blessings on the city of Borsippa, and Ê-zida, its celebrated temple-tower, implies that this foundation also desired to be admitted into the number of places regarded as holy, and on the same footing as Babylon, Ur, Erech, and Êridu—in fact, there is every probability that the prefixing of the story of the Creation to it by way of introduction is due to this circumstance.

There is probably but little doubt that the Semitic story of the Creation is the older of the two. This is shown by the fact that, though Merodach is the central figure in each, larger space is devoted, in the Semitic version, to the divinities who preceded him in the rule of the universe. Of course it is not impossible that the actual composition of the legend was comparatively late; but everything points to a period preceding that when it assumed the form in which we now have it. In the bilingual account, on the other hand, the wording throughout

suggests that Merodach had long been recognized as chief of the Babylonian pantheon.

The fact that there were other gods who exercised dominion in the kingdom of heaven before Merodach, seems to show that changes had taken place in the religion of the country, and it is not impossible that these changes are a reflection of its political history. Thus, from the first tablet of the Semitic story, we see that Anu, god of the heavens, was the chief divinity, and head of the pantheon. This is followed by a reference to the older Bel, and then to Aê, the father of Merodach. Farther on in the legend, where the revolt of Tiãwthu is related, Anu and Aê are again spoken of, and this in such a way as to suggest that they had been failures in their mission, as it were. They both went in turn against the foe, but without success, being (at least in one case) terrified at her frightful appearance. The explanation of this would seem to be, that it is intended as a symbolical representation of the development of the Babylonian religion. First came Anu, the deity personifying the heavens, worshipped at Erech along with the goddess Ištar, and also at other places in Babylonia. He would seem to have been the first of the great divinities, and this leads to the supposition that a state where he was adored as patron-divinity became, at some early period, predominant among the early kingdoms of Babylonia. The next one who failed to meet the Dragon of Chaos was Aê, the principal seat of whose worship seems to have been Êridu, identified with Abu-šahrein, near the Persian Gulf. Now the earliest period at which Erech came forward as chief state—or one of the chief states—of the Babylonian confederacy, was during the reign of Lugal-zag-gi-si, whose date is set down roughly at about 4,000 years before Christ; but, as far as we know, Êridu never had any great political predominance, though it may at some time have become the religious capital of the country. It would seem, however, to be certain that the adoption of Merodach as chief of the Babylonian pantheon was due to the rise of Babylon to the position of capital of the chief province, and the worship of this divinity continued in all probability until the decay of the city, when that of Anu-Bel took its place, that is, if we may accept the indications furnished by a tablet of the time of Hyspasines. Anu-Bel was worshipped at the well-known temple of Ê-saggil, which contained the great shrine of Bel at Babylon, and it may be supposed that, in consequence of a change in the teaching of the priests, Merodach

had at that date become identified with Anu, and worshipped under the double name.

It may therefore be taken as an established fact, that Merodach, being the divinity of Babylon, had been generally adopted as the chief of the Babylonian pantheon on that account, for all would naturally recognize the claims of the great god of the capital of the new empire. It must not be thought, however, that his kingship was accepted by all without question. There were naturally many who would have none of these innovations, and among them the Babylonian Noah (whose name has been found to read Uta-na(v)ištim) seems to have been counted. When the patriarch asked the god Aê what answer he was to give when questioned as to why he was building the ship (the ark), he was instructed to answer as follows:—

"It has been told me (that) the God Bel hates me,
I will not dwell in . . . and
[In] the territory of Bel I will not set my face—
[I shall] descend to the deep, with [Aê] my lord I shall (constantly) dwell.
[As for] you, he will cause abundance to rain down upon you."

As this is merely a legend, it may be supposed that the opinion here expressed, and put into the mouth of the Babylonian Noah, only reflects the attitude of a section of the people, who could not become reconciled to the new state of things, and remained faithful to the old belief in Aê as the head of the pantheon.

Fortunately, we are not without independent information as to what the Babylonian believed with regard to the genealogy of the divine personages which were the foundation of their faith, and the important inscriptions for this are the lists of gods. These texts are, luckily, numerous, but on the other hand are often in a fragmentary condition, which naturally places the student at a disadvantage when examining them. One of the most important of these lists, for its bearing on what is stated in the Semitic Babylonian Creation-Legend, is that published in the second volume of the *Cuneiform Inscriptions of Western Asia*, Plates 55 and 56. It will be remembered that Damascius says that the Babylonians denominated Tauthé or Tiāwthu the mother of the gods, pointing to a time when she was not the evil genius she is represented in the inscriptions dealt with in the present paper. If my comparisons be correct, this is confirmed by the list of gods to which I have referred, for we find there, at the beginning,

forty-one names of a divinity called "the lady of the gods," a goddess who is described in the recently issued fourteenth part of *Cuneiform Texts from Babylonian Tablets*, as having brought forth offspring on three different occasions. She was certainly not regarded as anything very evil, however, for this new text is described as a song concerning her — a song "better than honey and wine, better than grapes and apples (or something of the kind), purer even than butter" (which, as is well known, is clarified in the East).

Though there are neither in the names of the "lady of the gods," nor in those of her spouse Dun-sig-ê, any which resemble (as far as they are preserved) the names of Tiāwthu and her spouse Kingu, a few parallels at least occur, which make some sort of an identification possible. Thus the spouse of "the lady of the gods" has, apparently, two sets of names, each consisting of five—ten in all. Of these the second group is explained as *bennu*, a word used in the sense of "malady" in the recently discovered laws of King Ḫammurabi. The conjecture that *bennu* in this list of gods means "evil principle," or something of the kind, lies, therefore, very close. None of these names, to all appearance, contains any indication of the idea here suggested, except the third of the second group, A-ga-giga-dugga, which may be translated "the evil-speaking inundation"—a not inappropriate name. Upon the exception here referred to I do not wish to lay any stress. The list may not have anything to do with Tiāwthu and her consort at all, notwithstanding the seeming probability of it, but the two name-lists of the consort of "the lady of the gods" is followed by the names of three divinities who were possibly their attendants, and the third of this triad was, as it seems, called Tud-udda, "the offspring of Death." The deity Ugga, "Death," has already been referred to in the description of the Semitic story of the Creation, and it is noteworthy that Tiāwthu's spouse Kingu was counted worthy, for his evil deeds, to be his companion.

The above is immediately followed by the names of the deities belonging to Ê-maḫ, "the supreme temple," but whether this be an earthly temple of that name, or one in heaven or elsewhere of which that in Babylon was the type, does not appear. This section of the list ends with the names of the fourteen sons of the goddess Maḫ (were they the overseers of the fourteen precincts of Hades which the legend of Nergal and Eres-ki-gala allows us to presuppose?), and of her four porters or gate-keepers, and the question naturally arises

therefore whether she may not have been a form of the goddess of the underworld. It is noteworthy, in this connection, that in the text published in Delitzsch's *Lesestücke*, 3rd ed., p. 104, and in the *Cuneiform Inscriptions of Western Asia*, vol. iii, Plates 67 and 68, Maḫ is likewise identified with "the lady of the gods," showing that all the text of the list I have been describing, up to the point where the section mentioning the goddess Maḫ ends, refers to her, her consort, her attendants, her court, and her servants. There would seem then, to be but little doubt that she is the same as Tiāwthu in her earlier and probably more noble and beneficent form.

With regard to the succeeding portions of this noteworthy list of gods, very little doubt can exist, the agreement with the Semitic story of the Creation being most striking. Immediately following the family and the train of the goddess Maḫ, comes the name of Aê, the second opponent of Tiāmthu, and the king of the gods immediately preceding Merodach. He has thirty-six names, after which are given those of Damkina (Dawkina, the Dauké of Damascius), his consort, who has eleven. The next on the list is Merodach, eldest son of Aê, who had more than eight names (the text is unfortunately broken here, so that the exact number is doubtful). The members of his court follow, and probably included his consort Zer-panitum; his attendants, including the divine door-keepers of his temple Ê-sagila, and his four dogs, Ukkumu, Akkulu, Ikšuda, and Iltebu ("Seizer," "Eater," "Grasper," and "Holder"). Next we have the names of the river-god, whom we see, farther on, to be none other than our old friend Aê, who, having abdicated the throne in favour of his son Merodach, was henceforth simply the divinity of the deep, the sea, rivers, and water in general, as well as lord of deep unsearchable wisdom. His spouse, messengers, attendants, and doorkeeper (or doorkeepers) follow, after which the text breaks off. That the god Aê should occur twice in this list, as detailed here, is significant, and may be regarded as in noteworthy agreement with the legend which forms the subject of this paper.

How much we have still to learn about the religion of the Babylonians can at present hardly be estimated, but it must be something very considerable, our material, voluminous as it is, being in a rather fragmentary state. To mention only one document. The duplicate of the inscription giving the foregoing details is noted as being the largest tablet known, and its value, if complete, would be more than double what it is in

its present condition, which is saying much. In all probability the series to which it belonged, if not the tablet itself, contained the names of the deities of the Babylonian pantheon as far back as Tiāwthu, the first principle, herself, and it certainly contained explanations of the names of the gods under all their different attributes.

Other lists which exist give the Babylonian pantheon in another order, beginning with Anu and Anatu, the male and female personifications of the heavens. This is followed by other names, among them being Ansara and Kisara, "the host of heaven," and "the host of earth," Lahma and Lahama, who were synonymous with Anu and Anatu, and many others, all identified with these. The children of Anu and Anatu follow, and afterwards come Anu's messengers and attendants, including Gaga, who is stated in the Semitic story of the Creation to have taken the news of Tiāwthu's rebellion and Merodach's undertaking to subdue her to Lahma and Lahama. All these inscriptions seem, therefore, to be in agreement, though it is to be noted that there are others in which a different system is adopted. This, however, may be simply because they are extracts from larger texts, and not intended to give the names of the deities as they are supposed to have been created in chronological order.

Yet further inscriptions bearing on this legend are the astronomical tablets, of which a very important one was published in the fifth volume of the *Cuneiform Inscriptions of Western Asia* in 1884. In this text are apparently given the names of certain constellations, among them being two which are described as "the weapon of the hands of Merodach," namely, the *gamlu* or "finisher" (to all appearance this, or something similar, is its meaning), the star or constellation of the Ram being described as its head; and the *mulmulla*, the name of which occurs in the account of Merodach's fight with the Dragon of Evil, and is generally rendered "spear," or something of the kind. In this text the "star of the king," probably Regulus, is explained as Merodach, and recalls the fact that he had that title as one of his names, and was also really a king in the earthly sense of the word. Indeed, it is he whose kingdom's beginning was "Babel, and Erech, and Akkad, and Calneh, in the land of Shinar," Nimrod, to whom this domain is attributed in the tenth chapter of Genesis, being nothing else than a corruption of the name of Merodach, due to prefixing an *n* to the original form Amaruduk, taking off the last two letters, and changing the vowels. Another important inscription is that giving many of these and

other constellations, which I copied several years ago, and published in transcription in the *Journal of the Royal Asiatic Society*, 1900, p. 573 ff. This has the star or constellation of the bow, the long chariot (perhaps the great chariot in which Merodach went forth to fight the Dragon), the Star of Death, with whose divinity Kingu, Tiāwthu's spouse, was associated, the constellation of the raging dog, probably one of those creatures described as Tiāwthu's helpers, and the Star of Merodach, "king of the Igigi," or gods of the heavens. In all, there are thirty-six constellations, being three for each month, as stated in that part of the legend where Merodach's creation and arrangement of the heavenly bodies are spoken of. From the fragments known to him, Mr. Robert Brown, jun., had already recognized this fact.

But in the compass of a single paper it is impossible to touch upon all the details of these interesting legends, every section of which presents several points of interest. Many, unfortunately, are of a somewhat technical nature, but I trust that what I have said concerning those of which I have spoken will not have been thought too dry. I should have liked also to touch upon those interesting glossaries of the last tablet of the Semitic series, but this I think best to reserve for the notes upon these legends which I hope to write later on. At present it will suffice to say that these fragments, which have been known to scholars for many years, show the importance which the ancient Babylonians attached to the last tablet of the series, and also to the legend as a whole. There is also part of a commentary bearing upon the first tablet of the series, as well as some fragments of late date which are possibly copies of early glossaries and commentaries. It is true that other inscriptions also had similar critical apparatus and aids to study, but there were probably but few which were so well provided. It was to all appearance their holy book—their Bible, hence the care which the early Babylonians lavished upon it. Whether the glossary to the last tablet of the Semitic version bears upon the question of the origin of the legend is uncertain, but it probably points to a Sumerian, that is, a non-Semitic source for it. Like all other explanatory lists from Babylonia and Assyria, it is written with the non-Semitic words in the left-hand column, and the Semitic translations on the right. This probably points, as in the case of other bilingual texts, to the probability that the Semitic version (notwithstanding that it is the only one with which we are acquainted) is not the original one. If this be the case, the original language was the dialect of Sumerian, in

which language many texts were written, such as the hymns to Tammuz and other divinities, and that which I have called "the lament of the Daughter of Sin."

As many nations are engaged in the work of unearthing the remains of Babylonia and Assyria, there is every probability that we shall sooner or later obtain still further inscription bearing on the text, and probably many completions. Whatever one may write, it is therefore certain before long to be super seded. No Assyriologist can therefore at present hope to do much of real permanent value. It is on that account that much of what I have written to read before you this afternoon already needs change and supplementing, but when my paper is printed in the Journal of the Institute, I trust that it will be found, within its compass, up to date.

Discussion.

The Chairman.—I am sure we have all listened with great attention to this very valuable paper. It is difficult to in any way measure or estimate the amount of profound research and infinite patience—"that true mark of genius," as Carlyle expressed it—that this paper shows. To those of us who remember the beginning of the reading of the cuneiform inscriptions, it is especially interesting to have these highly developed, if not fully developed, discoveries of the thoughts and ideas of those very ancient people.

It may be a little perplexing to some of us to follow the thoughts in their minds, but one point presents itself to us, and that is the strong likeness we see in these people's ideas to those of Agnostics of the present day, and it is very interesting to find them recurring after these thousands of years.

Mr. W. St. Chad Boscawen.—I hope you will excuse me when I say that I think it is hardly fair to discuss this extremely elaborate paper until it is printed. It is a good deal hampered, too, by the work that has appeared within the last few days. That work is certainly most up-to-date. But there are one or two points to which I would refer in these traditions, as I believe I was the

first person who brought them before the Victoria Institute.* An immense amount of material, dating back to the seventh century B.C., has been collected within the last few years, from the library of Nineveh and other sources, and the Babylonian series constitute essentially an epic poem.

All must think, like the *Iliad* of Homer, that it is not a work or composition of one period, but a work composed of materials gathered together from various sources fused and blended into a great religious whole.

I think those who have read Dr. Pinches' paper, and especially those who have read Mr. King's valuable work on the subject, will see that, like the first chapter of Genesis, it contains material of more than one period.

Dr. Pinches refers to the great prominence given to God in the early part of the poem and in the account of the deluge. Some years ago Dr. Pinches published in the *Journal of the Royal Asiatic Society* the bilingual legend of the Creation. That legend, to my mind, is much more important than the story of the Creation, and, I think, if Dr. Pinches takes the trouble to look through it, he will see that is a document that has undergone a most clumsy sub-editing, and that if he takes lines sixteen and seventeen and possibly nineteen from the text, he will find portions that are clumsily made to connect themselves with the school of Babylon, a city that took no very prominent part in the affairs of the dynasty; but as soon as the kings came into power there was a great change in government. The centralization of government and of law is shown by a series of laws which, curiously enough, were codified about 2200 B.C., and continued in use until about a century before the Christian era and were afterwards revived and handed on. During that period the epic was drawn up, and you find that both in the seventh tablet and during this bilingual period, the epithets of their gods have been taken and used for Merodach. Then, again, the epic seems to have undergone slight alteration at the hands of the Assyrian scribes, but not much—they were uneducated. There was no Assyrian literature really except the inscriptions.

* "Cuneiform inscriptions as illustrative of the times of the Jewish Captivity," *Trans. Vict. Inst.*, vol. xviii (1884). Mr. Hormuzd Rassam has written on the same subject in vols. xiv and xvii.—Ed.

The epic was probably drawn up during that period, but prior to that there was a story that had been associated with the god mentioned here. He is not only the god of water, but the god of agriculture, and the very open lines of the new portions of the seventh tablet all distinctly show how prominent the god of agriculture was. The account of the real work of the Creation does not begin until the middle of the fourth tablet.

The composition of this legend shows that we have to go back prior to 2000 B.C. for the later portion of it, and that is clearly shown by this remarkable Semitic fragment which Dr. Pinches has referred to, and these remarkable hymns which have been published. Those hymns are really popular songs; but the interesting part of them is that their grammatical construction and peculiarities are the same as those found in the creation narrative. Go back to the creation week that appears in the first chapter of Genesis, in which everything culminates on the seventh day. We are constantly told by those who have been to Babylon (and I have been there myself), that the sabbath is a Babylonian institution. There is no proof of it. A sabbath applies to the seventh, fourteenth and twenty-first days; but it only applies to the kings. The king would not wash or change his clothing, or ride on those days that were so set apart, otherwise all the functions of life were carried out on the seventh day, and the king being, *ex officio*, a priest, it was connected with the priests.

I will close my remarks by saying that Dr. Pinches' paper will be extremely valuable to us. I think almost all Assyriologists have had a turn at these tablets, and I suppose we have now the most complete and ancient poem in the world.

Mr. MARTIN ROUSE.—I would ask Mr. Boscawen if it is not the fact, as stated in Professor Sayce's *Higher Criticism and the Monuments*, that the days of the week were named by the Babylonians?

Mr. BOSCAWEN.—Professor Sayce says so, but I have never found it so.

Mr. ROUSE.—Granted that is not correct, how is it that the king is told not to light a fire or drive in his chariot on a certain day, and that the day is called "the day of rest to the heart"; and further, that even the prophets were not to prophecy on that day? It is a very remarkable thing.

Mr. BOSCAWEN.—It is nothing of the kind, sir.

Mr. Rouse.—It is so stated in Professor Sayce's *Higher Criticism.*

Mr. Boscawen.—No; an augur does not make an augury.

Mr. Rouse.—The so-called prophets of Babylon might not prophecy. An augur would be a priest, surely!

I would ask why we are to suppose that the documents that Mr. Boscawen says are to be attributed to Babylon should be when the text itself is so unlike them?

Then as to the creation of man from the blood of Merodach, that is a little like man being made in God's own image and being a rational spirit. Are we to suppose that the Jews borrowed it from the Babylonians?

Again, there is something in the Bible itself which looks as if the Jews had forgotten their language in Babylon, for we find that when Ezra, the scribe, read out the law of God, the Levites had to give the people the sense of it. I should think, decidedly, it meant that they had forgotten their own tongue. Therefore, how is it conceivable that they should invent those ancient Hebrew manuscripts which are constantly referred to in other parts of the Bible?

I entirely deny that in any possible sense can that second chapter of Genesis be called "The Creation." If we suppose that to be called the creation, then, according to that, man is created on the bare earth with not a single herb in the ground, and then a garden is made and he is put in that, and everything outside is waste and empty until God makes the herbs of the field after he goes out of the garden, for it is never mentioned until after. Therefore, if that be an account of the creation, it is an exceedingly poor one.

May I ask Dr. Pinches who is referred to by that writer, Damascius, as "the only begotten son"?

Dr. Pinches.—Merodach.

Mr. Rouse.—That I hold to be a remarkable fact that this being, whose ancestors, the dragons, emblems of light and evil, is called "the only begotten son." We all know that in Egypt there is Isis and Osiris and their son Horus, and we have, certainly, accounts in Babylon of Istăr and the son she is to have. Whether that is Merodach or not I will get Dr. Pinches to answer. Then we have the tradition of a wonderful woman, and her son, who was to work

a great deliverance in the world. Istăr, as Professor Sayce has shown, is no other than Eve.

There is another point about Merodach. Dr. Pinches has told us on a previous occasion, and now, that Merodach is the same as *Nimrod*. In Professor Boscawen's lecture on "Discoveries made in Elam" he gives the actual name Namarandu as almost identical with Nimrod.

Mr. BOSCAWEN.—The name means "Lord," and "Namarandu" "Lord of the City."

Mr. ROUSE.—So it may in the Bible.

Mr. BOSCAWEN.—Certainly, that is what I say.

Professor ORCHARD.—I think we are all of opinion, on reflection, that this curious epic poem was founded on something in the nature of sober fact and history, and we shall, I think, be of opinion that the writer must have had before him the early chapters of Genesis. The imaginative point which has just been referred to (I may say painted on canvas and illustrated by nature), was doubtless founded on some very simple and unvarnished statement of facts. Those facts we find in the early chapters of Genesis. Who wrote those early chapters? We may think, I suppose, that Adam himself, or his immediate descendants, were those who first wrote them.

With regard to Nimrod, I think he had mistaken the prognostication of the promised Messiah who was promised to our first parents in the Garden of Eden. I have long been of opinion, and every day confirms me, that the more discoveries that are made, the more we shall find that the book of Genesis is, beyond all question, of Divine origin. It is very well able to take care of itself, I think.

The Rev. F. A. WALKER, D.D.—Mr. Chairman, I shall not detain you long at this hour. I only ask leave to put to the learned lecturer one question, viz., in what nation, he thinks, the lament over Tamus, to which he alluded, originated. We know it is a wide-spread classical tale in the poems of old. Its local habitation was doubtless Assyria; but I would ask Dr. Pinches whether he thinks the Assyrians were the first inventors of the legend, or the Babylonians? It also finds an honoured place in Ovid's poem and the "Idyls of Theocritus."

The Rev. JOHN TUCKWELL, M.R.A.S.—I should like to add a few words to what has been said on this most interesting and

valuable paper. We may congratulate ourselves that a very close investigation is being made at the present time of these Creation stories both in the Babylonian series of tablets and in Genesis; the more closely they are investigated the more we may be sure the truth concerning both will come out.

I think we may come to the conclusion, already, that the Babylonian story is very largely legendary. But whenever we find a legend it is natural to inquire whether there may not have been some basis for the legend. Now if we look into the Babylonian legend, we shall find some prominent points of it that we must admit to be matters of fact. First of all there is a chaos of the primeval elements of creation, with no distinct discrimination between land, sea and clouds. Then you have an extraordinary intervention of the power of Merodach—a fight with the dragon of chaos and a description of the separation between land and sea, and clouds and water, and then there follows something of an astronomical nature, and you have the constellations referred to. Subsequently to that you have the creation of different animals, plants and man.

Now both the story in Genesis and the story as described by modern science have arranged these facts in exactly the same order. You will remember that the geologist tells us about an universal ocean, and you have these words occurring in the Babylonian story, "The waters of the sea were one." Then in the first chapter of Genesis you have the account of the appointment of the sun and moon to regulate the day and night, and the appearance of the stars followed by the creation of plants, animals, and man.

Now I beg to submit that we have a most important question before us—How did the Babylonian legend become framed if there were not some knowledge of the facts before the legend came into existence? And if the facts were known before the legend came into existence (and I take it there is no possibility of denying that they must have been), there is then this very pertinent and difficult question. How came those facts to be known? If you compare the first chapter of Genesis with the Babylonian story, you have a simple unvarnished account of facts as they were. I challenge any charge against that chapter of any single incorrect word in the light of the most modern science from beginning to end.

Now where did that chapter come from? Mr. Boscawen may say that it came into existence in Babylon in the seventh century before Christ. I see no reason why we should say it came into existence then, rather 2,250 years before Christ. If the legend be based on the facts, they must have been known before the legend was composed, or as far back as 2,500 years B.C. But those facts could not have been known as the result of scientific investigation. They must have been supernaturally communicated. There was no known scientific investigation that could have revealed them. We are therefore brought, I think, to this conclusion, that there must have been a communication of these facts to mankind before they appeared, as Mr. Boscawen says, in Assyrian and Babylonian literature. So also with regard to the Hebrew account, there may have been editing; but composing such narratives as those is quite another thing. Editorial touches here and there there may be, but there is not the slightest foundation for believing in the existence of any Jehovistic or Eliohistic documents. There is no trace of any such documents in all the literature of antiquity, and neither Jew nor Gentile knew anything about them until in recent years they were invented in the brains of the higher critics.

Dr. PINCHES, in reply, said: Mr. Chairman, ladies and gentlemen, I do not think at this late hour I need address you at any length.

The remarks on my paper have been rather more of the nature of comment than criticism, and here I may say that I thank all who have joined in the discussion for their remarks, and especially Mr. Boscawen for his fairness.

It is a matter of great regret to me that I was unable to incorporate the discoveries of Mr. King in my paper in time to read it to-night, but I hope, as I have said, to make up deficiencies when my paper is in print.

It is needless to say that I agree with most of what Mr. Boscawen has said concerning the date of the legend and many other points. I shall certainly examine the lines which he mentions of the non-Semitic story of the creation—lines 16, 17 and 19—in order to go over, if I can, to his point of view.

Concerning the remarks of Mr. Rouse, I would mention the point of the week, and that I do without reference to any question as to the existence of the creative week. Certain days are mentioned as being unlucky days (the word used is *ḫul-gal*, "evil-making"), and

those days are said to be unsuitable for the king and other persons mentioned to do the things referred to. This is not quite what one would expect for the sabbath. The *ḫul-gal* and the sabbath are apparently two different institutions.

As to whether the Assyrian word *šabattu* is connected with the Hebrew sabbath or not I leave to your individual opinions, but it seems to me very probable that it is. The days with the Babylonians were not numbered from one to seven and then beginning again, but they began with the first day and went straight on to the 29th or 30th, as the case might be. In the lists there are certain days that have special names. Amongst other names quoted are *ḫul gal* and *šobat,* which latter was the fifteenth day of the month. So we have this little difficulty. Perhaps there is a confusion of the two terms, and the Hebrews, borrowing the word sabbath, may have applied it to their development of the term *ḫul-gal* which was *evil* in the eyes of the Babylonians.

Mr. BOSCAWEN.—There is no trace of it in any ordinary document.

Dr. PINCHES.—No, it only occurs in the list with the numbers of the days.

Concerning *Istăr* being the same as *Eve.* I leave that also to your individual opinions.

I do not know whether there is really anything in the story of the flood where *Anu* is spoken of in connection with the rainbow. I should like to have more information from the Babylonian inscriptions on that point before I pronounce an opinion.

Mr. MARTIN ROUSE.—I have read it from the translations several times.

Dr. PINCHES.—Yes, I know it has been translated so.

Then as to the question of *Merodach* and *Nimrod,* we must admit that *Ninmarad* is very similar to *Nimrod,* but I think, as I stated in my article in *Hastings' Dictionary of the Bible,* that certain names were manipulated by the Hebrew scribes simply because they were the names of Hebrew deities and because they were polytheistic they did not wish to commit them to paper. Of these Nimrod is one.

I do not know that anything calls for an answer in the remarks of Professor Orchard. I am much obliged to him for his kind expressions, and I will now pass to Dr. Walker's question concerning the lamentations for Tammuz. These go back certainly to 2,000

years B.C., or perhaps earlier. The inscriptions published by the British Museum lately are in the Akkadian language and have no Semitic translation at all. The probability therefore is, that they are very ancient indeed, and the earliest version of these hymns being in the Akkadian language, it is likely that they originated with those people. (I use the word Akkadian, but perhaps I should say Sumerian.)

I am much obliged to Mr. Tuckwell for his kind remarks. I do not think there is anything to answer there.

The vote of thanks having been put and carried unanimously, the meeting adjourned.

Note upon the non-Semitic (bilingual) story of the Creation. (See pp. 33 and 38.)

This text is treated of in Section VIII. of this paper. The lines mentioned by Mr. Boscawen. "sixteen, seventeen and possibly nineteen," refer to "the glorious city," the seat of the joy of the gods' hearts, which Merodach had proclaimed as supreme; and speak of this deity binding together a foundation before the waters, in order that the gods might have a dwelling which should satisfy their hearts—"a seat of joy of heart," as the original text says. These lines, however, seem to me to belong so closely to the context that their elimination would impair the sense; and I am therefore unable to follow him in his argument, however much I should like to do so.

ORDINARY GENERAL MEETING.*

REV. F. A. WALKER, D.D., F.L.S., IN THE CHAIR.

The minutes of the last meeting were read and confirmed.

The SECRETARY (Professor EDWARD HULL).—I have first to express the regret of the Council, in which I am sure you will all join, at the inability of the President to be here this evening. He is far from well, and he says it is quite impossible for him to come to London, which he much regrets.

The following elections were then announced :—

LIFE MEMBERS :—J. S. Phené, Esq., LL.D., F.S.A. ; Miss Alice M. Whidborne.

MEMBERS :—John F. W. Deacon, Esq., M.A. ; Arthur W. Sutton, Esq., F.L.S. ; The Trustees of the Bermuda Library, per Lieut.-Gen. Sir H. Geary (Governor).

LIFE ASSOCIATES :—Rev. R. Ashington-Bullen, M.A., F.G.S. ; Rev. Rupert S. Strong, B.A. ; John Alexander Strong, Esq.

ASSOCIATES :—The Rt. Rev. the Bishop of Honduras, D.D. ; Rev. Prof. G. A. Barton, Ph.D. ; George A. Manwaring, Esq., C.E. ; Rev. Oswald J. Hogarth, M.A. ; Rev. William E. Emmet, M.A. ; Charles W. Odling, Esq., C.S.I. ; Ronald Hamlyn-Harris, D.Sc., F.L.S.

HON. CORRESPONDENT :—Dr. Ion Stephansson.

The following Paper was then read by the Author, entitled :—

THE FUTURE OF ISLAM.

By Professor D. S. MARGOLIOUTH, D.Litt., Laudian Professor of Arabic, Oxford University.

THE eminent statesman and historian J. Bryce, in his recent Romanes Lecture,† expressed the opinion that Islam might perhaps last only a couple of centuries more; he regarded this not only as possible but probable. His opinion seemed paradoxical, and some persons even fancied that he had been incorrectly reported. For from a superficial view of the situation it would scarcely seem to be justified. The number of Moslems in the world cannot be precisely ascertained, but from such statistics as can be procured, it would appear to approach 200 millions.‡ Their religion is dominant in Africa,§ partly dominant in Asia, and not unknown in Europe or even America. Nor does its power of expansion appear to have run

* Monday, January 5th, 1903.

† Oxford, 1902, p. 45.

‡ In the *Statesman's Year Book* for 1902 about 150,000,000 are noticed in the lists; but some of the figures are too low, and many must be omitted. Krimskiy, *loc. citand.*, p. 108, says 300,000,000.

§ A book by L. C. Barnes bears the title, *Shall Islam rule Africa?*

dry, and, especially in the first three quarters of the nineteenth century, there were many movements in Asia and Africa which seemed to promise it new life and extended conquests. A writer* who framed a careful survey of the Mohammedan world in 1888, declared that in India and China, Islam only develops, whereas the other native religions are in decadence, while those introduced from Europe barely exist. It was asserted by a leading Orientalist† that Islam must at some time become the religion of the whole of India; and great accessions of converts, said to have adopted Islam in order to be freed from the caste-system, were adduced as proof of this. A form of this prophecy appears as late as 1899, in the Asiatic studies of Sir Alfred Lyall,‡ who states that individual conversions are still frequent, though the extension of Islam has naturally slackened with the rapid decline and dilapidation of the political dominion with which the faith was at one time bound up; he holds, however, that it may yet be the destiny of Islam to provide India with a national religion, while acknowledging that it is fast losing the chance of doing so, which, if neglected, will not recur. In China the growth of Mohammedanism in recent years was such as to cause alarm to European observers,§ who feared that China might be the source of a fresh crusade against civilization in favour of Islam. Those fears have not as yet been near realization; yet so recent a writer on China as A. Colquhoun‖ warns his readers that Mohammedan discontent in that country may break out into a blaze. In India, China, and the Dutch colonies, where Islam is also said to have made great progress,¶ proselytism was in the main carried on by peaceful methods; in Africa it was carried on partly by peaceful methods, but also in many places by force. Mohammedan progress on an enormous scale is reported from various parts of that continent; but since Lord Kitchener's victories in the Sudan, that progress is said to have been checked, if not entirely arrested.** Yet other movements, even after the crushing of Mahdism by the British, seem still to continue, and are occasionally depicted in the language of alarm.†† Although then writers of very recent date declare that

* Chatelier, *L'Islam au XIXme Siècle.*

† Von Kremer: see Krimskiy, *Mohammedanism and its Future* (Russian), Moscow, 1899, p. 106.

‡ p. 321.

§ Sell, *Essays on Islam*, p. 204.

‖ *The Overland Route to China*, 1900.

¶ Krimskiy, p. 107.

** Atterbury, *Islam in Africa*, p. 182.

†† *Saturday Review*, Aug. 16, 1902, p. 193.

Islam is still making gigantic strides,* it is probable that there is less evidence for the statement now than there was fourteen years ago. Still it would not appear that Islam had ceased to grow, or was (in numbers at least) beginning to decay.

On the other hand, the paradoxical opinion which has been quoted is shared by many observers. A missionary who had worked for many years in Asia Minor, writing in 1870, prophesied that Mohammedanism would probably melt away like a frozen iceberg before the gradually increasing light of modern science, of civilization, and of Christianity;† that its doom was fixed, and the wisdom of men will consist in executing the sentence without haste and yet without hesitation—whatever he may have meant by this last phrase. Some Arabs affirmed, with complete indifference to the able Dr. Pruen,‡ that when the Turkish empire is destroyed Mohammedanism will become a thing of the past—and few persons give the Turkish empire a lease of 200 years. In the observations with which Lenz closes the narrative of his journey to Timbuctoo,§ he declares that Islam can subsist only when left to itself, and that contact with European civilization means death to it. It would not be difficult to cite other passages to the same effect; while it would be equally easy to quote opinions to the effect that Islam has an indefinite period of time before it.

It is not my intention to criticize these opinions, nor indeed can the course of events in the future be very well criticized. It is however admissible to *comment* on the opinions quoted, in the line of examining what is meant by the disappearance of Islam, and of analysing the elements of disintegration which, in the opinion of some observers, are so likely to lead at an early period to the destruction of the whole fabric. For this study I can use a few observations of my own, made in short visits to Mohammedan countries; but to a much larger extent those of Europeans whose residence in the East has been more lengthy.

A certain ground for believing in the speedy disappearance of Islam would be found, if it could be shown that in the struggle for life the equipment which it provides is less efficient than that furnished by Christianity, Judaism, and some other religions. This is indeed asserted by some writers,

* Krimskiy, *l.c.*
† Van Lennep, *Asia Minor*, 1870, i, 283.
‡ *The Arab and the African*, p. 258.
§ *Timbuktu*, 1892, ii, 376.

and certain phenomena seem to bear it out. The author of a prize essay,* published in 1881, on the influence of Islam on the life of its professors, called attention to the fact that at Constantinople intellectual capacity, where it was required, was chiefly provided by Christians, whether native or European. "The steamship lines in the Levant belong to Greeks, Armenians, French, Austrians, Russians. The Osmanli fleet is under the direction of English officers. In the Turkish land-army Prussian, French, and English officers have important posts. The railways are built by English, French and German engineers. The telegraph lines in Turkey are managed by Poles and Italians." Twenty years later, Mr. Dwight,† writing in 1901, declares that the same condition prevails. "The Moslem masses are hewers of wood and drawers of water. They are bearers of burdens, they are donkey drivers, they are the smallest of small traders, they are artisans whose tools compete with their hands in clumsiness. The Turkish army depends on foreign Christians for its organization as well as for its arms and ammunition; and to a considerable extent for the instruction of its officers. The treasury would go to pieces if Christian counsellors were not at the side of the minister of finance. Rarely does a wealthy Turk venture to keep up an establishment without a Christian to manage his accounts. A Mohammedan banking-house is almost unthinkable. The most important book-publishing houses for Mohammedan literature are owned and operated by Christians." The same probably holds good of the other cities of the Turkish empire. In the towns of northern Persia, where there is a native Christian by the side of a Moslem population, the Christians will undertake none of the lower forms of labour, and indeed require a higher rate of wages than the Moslems. In the villages of the same region those in which there is a majority of Christians are obviously the more prosperous. Mr. Dwight accounts for this fact by certain of the doctrines which he attributes to Islam. They give the reason for "the failure of Mohammedanism to progress in lines of effort which make for prosperity and benefit the world. In them is the explanation of the battered old houses and the dilapidated steamers, and the squalid swarm of incompetent labourers found in the

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* Pischon, *Der Einfluss des Islam auf das Leben seiner Bekenner*.
† *Constantinople and its Problems*, p. 50.

city until the skill of non-Mohammedans is brought in to supply the lack."* If this were so, *i.e.*, if the characteristic and essential doctrines of Islam led to inefficiency and incapacity, we might prophesy that with the struggle for existence constantly growing more acute, as the room for expansion becomes smaller, Islam must wholly change so as to become unrecognizable, or both ostensibly and really disappear. There are, however, reasons for thinking the question more complicated than the able writer who has been quoted supposes. In one part of the world, where neither Mohammedans nor Christians were subject to the influence of Europe, and where the former were subordinate politically to the latter, in Abyssinia, competent observers declared the Mohammedans both morally and intellectually superior to the Christian population.

According to Rüppell,† writing in 1838, the Abyssinian Mohammedans were more industrious, better educated, and, in consequence of their own exertions, far more prosperous than the Christians of that country. The same judgment was passed by the traveller Von Heuglin,‡ in 1868. The judgment passed on the Christian inhabitants of Mohammedan countries before the active interference of Europeans is often exceedingly harsh.

It would be possible to adduce many other facts which render it improbable that the profession of a creed has in itself much to do with prosperity or efficiency—probably it has some influence, but there is a tendency to overrate it. Other causes must then be sought for the state of things described by Pischon and Dwight. And some of these are obvious. Community of religion with the nations of the West brings resident Christians into closer relations with the dominant nations of Europe, and they prosper not as Christians but as Westerns. Similarly that accurate exponent of the affairs of Morocco, Budgett Meakin,§ assures us that the treaties assuring protection in that country to the native agents of foreign officials and merchants have been taken greater advantage of by Jews than Moors; the Jews having ties with Europe which the Moors lack, and also being better acquainted with the necessity for those treaties than are the Moors. It is asserted that in

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* p. 81.
† Rüppell, *Reise in Abessinien*, i, 368.
‡ V. Heuglin, *Reise in Abessinien*, p. 253.
§ *The Moors*, p. 460, *cf.* Cunninghame Graham, *loc. citand.*, p. 51.

Persia fear of the European press assures the native Christians better treatment than is accorded to the Moslems, about whose wrongs the press of Europe cares not. Vámbéry, writing in 1875,* further accounted for the prosperity of Christians at Constantinople by their exemption from military service, and so being enabled to pursue their industries continuously, whereas the Moslem workers were liable at any time to be interrupted.

Besides these explanations it may be remembered that during the history of the Caliphates of Baghdad and Egypt offices of trust and importance were frequently committed to Jews and Christians, partly on the ground that they were more under the control of their masters than co-religionists who could claim equality; and partly because the disabilities under which they laboured had necessarily caused them to develop energies and talents which the ruling caste had no occasion to employ. This policy has never been altogether abandoned by Mohammedan rulers, as the most modern experience testifies; but if the motive for their employment of Christians in offices of trust were examined, it is unlikely that even a dim consciousness of the superior business capacity of a Christian would be admitted; at most they might grant that in times when business and politics had gravitated to the West, those whose religion brought them in touch with Westerns were most likely to be intelligent and sagacious in their dealings with them.

My own experience of Mohammedans, as I believe that of many travellers, tells of many honest and industrious workers, of men of high character and principle, with most of the qualities that succeed in the business life of Europe. The theory of Vámbéry, who insists constantly on the difference between the European and the Asiatic, seems to me more in accordance with the facts than that which finds the difference in aptitude between the Moslem and the Christian; and there is much that is attractive in the view of Schuyler and others, according to which the difference between Eastern and Western capacity is one of development: the Moslems of the less visited countries standing on the level of Europe in the fourteenth or fifteenth century, when this country was still backward, but, unless we alter the meaning of words, was Christian. The chief evils of Moslem countries are ascribed by Vámbéry to bad government, and bad systems of government, and this too

* *Der Islam im 19ten Jahrhundert.*

seems to agree with the facts. It is rather curious that those who find in the Moslem religion the source of Moslem incompetence, often paint either the native Christians or the European residents in blacker colours than the Moslems; indeed the books which deal with modern Constantinople treat the European residents with no sort of charity or mercy; and both travellers and missionaries in Africa and Asia are apt to describe the influence of the European as merely corrupting. Since these Europeans represent men of ordinary or average character, and by no means the scum of the communities whence they emanate, it seems hard to make Islam responsible for the backwardness of the one class of the population, without making Christianity responsible for some, at least, of the peccadilloes of the other. While then the theory that Islam is to blame for the backwardness of Mohammedan peoples is not to be rejected entirely, the degree to which it is true is so exceedingly uncertain that it is difficult to be sure of the disappearance of the system in the struggle for existence. It may account in part for the dilapidated steamers of the Turkish empire; but there are other causes which contribute to their dilapidation.

What, next, is meant by the disappearance of Islam? Many writers have asserted that Christianity must certainly take its place. The Christian powers, says Lenz,* represent civilization and progress. Islam is identical with stagnation and barbarism. Many other writers, especially, but not exclusively, missionaries, could be quoted to the same effect. Some, such as Schweinfurth,† appear to hold that Christianity is the only remedy for Mohammedan countries, but despair of its ever making way.

It certainly seems unlikely that two or even three centuries will see the transformation of the whole Moslem world into a Christian world, whether we accept the evidence of facts or look to the working of principles.

Of Christian missions to Mohammedans at present the most that can be said apparently is that they are not complete failures. Of those at Kashgar the eminent explorer Sven Hedin‡ says, "their energies are wasted, their labours fruitless, their lives empty, hard, and of none account." Of the three missionaries whom he saw, one, who had laboured for ten years, had never made a single proselyte; indeed, he had made no

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* *Loc. cit.* † *The Heart of Africa*, ii, 435.
‡ *Through Asia*, i, 237.

serious attempt at conversion. Nor were the others more successful. A missionary in Syria, who recently published a narrative of adventures, left the impression that he had been no more fortunate.* On the other hand, it would appear that occasional conversions are known in Persia, even on a large scale; and of persons who were virtually Christians though professedly Moslems I heard a good deal; in some cases these would appear to be quite desirable accessions, though not in all cases. Dr. Adams† speaks of Babism having in some cases served as an intermediate stage between Islam and Christianity, and there is no improbability in this. In India conversions appear to be fairly common, though perhaps not more than sufficient to counterbalance transference in the opposite direction. Of the effect of missions in North-West Africa we read rather contradictory accounts. Atterbury‡ quotes the report of a missionary in Morocco to the effect that accessions had been constant, and that every one baptized had renounced Mohammedanism; making it appear that the rule which makes apostasy a capital offence had been relaxed in that unprogressive country.§ The inference was drawn that Christianity had a better chance against Islam in a country which had no brilliant period of Mohammedan civilization to look back to than in countries like Syria and Egypt, or India, where the religion was associated with a rather glorious history. The evidence of other travellers makes it appear that this statement about conversions in Morocco on a large scale must have proceeded from momentary enthusiasm rather than from a calm survey of the facts. The talented lady who writes under the name of Frances Macnab, and who perhaps is rather wanting in sympathy with missions, declares in her charming book on Morocco|| that not a single convert is ever made. Mr. Cunninghame Graham, in his interesting work on the same country, which bears date 1898, speaks in the style of Frances Macnab.¶ "Christ and Mohammed," he says, "never will be friends; their teaching, lives, and the conditions of the different people among whom they preached make it impossible; and even the truce they keep is from the teeth outwards, and their respective followers misunderstand

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* *Spectator*, Aug. 16, 1902, p. 231.
† *Persia by a Persian*, 1900, p. 467.
‡ *Islam in Africa*, p. 172.
§ This is also attested by Meakin.
|| *A ride through Morocco*, 1902.
¶ *Mogreb el-acksa*, p. 25.

each other quite as thoroughly as when a thousand years ago they came across each other's path." This writer is one of those who regard the effect of Christian agencies among Mohammedans as wholly injurious. From no quarter of the mission field does it appear that there is anything like a turn of the tide in the direction of the adoption of Christianity on any considerable scale. And since in many regions agencies have been maintained for many years, it seems improbable, on the evidence of facts, that the merging of Islam in Christianity is to be looked for in the future.

There are also certain *a priori* grounds which make in the same direction.

The first of these is to be found in recent developments of Christianity, which are likely at some time or other to render missionary effort exceeding difficult, if indeed they do not either suppress it altogether, or absolutely remodel its character. Without doing more than allude to this subject, we may observe that the conception of conversion as the exchange of one system for another must be vastly altered if it be no longer possible for the missionary to hold in his hand a sacred book as a substitute for the sacred book to which the Moslem professes allegiance: if the case of the Koran against the Bible, so far as it is negative, be held by the missionary to be proved. What will exactly be meant by a proselytizing mission, when the growing aversion to dogmas and definite beliefs which is characteristic of our age has reached its climax, it will be hard to say; hence the notion of the conversion of the Islamic world to Christianity would defy analysis if we had grounds for supposing the future of Islam to lie therein.

In other words, the polemic between Mohammedans and Christians will of necessity assume a different shape to that which is embodied in classical works of controversy, when the aggressive polemic of the Mohammedans has virtually received the assent of the Christian world; and that this is likely to be the case would appear from the trend of opinion in Europe.

But even before this radical change in the attitude of Christianity towards religious books and religious dogmas has become universal, the work of missionaries is seriously hindered by the competition of rival agencies, and the bickerings between antagonistic sects. At Urmi, besides the Nestorian natives, no fewer than four branches of European Christianity have established missions, at times at open variance with each other; and both here and elsewhere the relations between the native Christian sects are apt to be anything but cordial—cases

in which the intervention of the Mohammedan authorities is required are not uncommon. The effect of these scenes on the Mohammedan spectators is detrimental to the Christian cause, since the Koran declares dissension to be of the essence of Christianity, and destined to adhere to it till the last day. On the other hand, the presence of rival missions at work among the native Christian communities is said to weaken their attachment to the hereditary religion, and while raising their intellectual level, to be of little use for the maintenance of Christianity even among them.

And thirdly, missionaries have ordinarily some difficulty in gaining access to Mohammedans at all. The agents stationed in Persia and Asiatic Turkey ordinarily abstain from all attempts to convert either, because their rules forbid them to make any, or because such attempts could only lead to the abandonment of their ostensible work, while failing to produce any effect on the Moslems. In several of the places where Mohammedans are subject to Christian governments missionary work is prevented or discouraged by the authorities; and this practice has the approval of some observers, who find that the absence of any endeavour on the part of the government to shake their faith, leads to the diminution of fanaticism and accomplishes automatically part of the work which the missionaries would endeavour to achieve. These and other considerations justify us in the opinion that the transference of large masses of Mohammedans to Christianity is not an operation at all likely to be realized in any space of time which it is reasonable to contemplate.

Other writers speak of a general awakening of Islam, and twenty-five years ago Mr. Schuyler* declared that such an event seemed near, though he knew not whether it would be beneficial or otherwise to the human race. It might be asserted that this prophecy had come after the event; the eighteenth and nineteenth centuries had already seen awakenings of Islam on a great scale. Such were the Wahhabi movement which engulfed Arabia, and advanced as far as Damascus†; the Babi movement, which threatened to overrun Persia; the Mahdist movement, from the effects of which the Sudan has just begun to recover. The home of many of these sects has been Arabia; some are professedly waves of the mystic or pantheistic doctrine which has

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* Schuyler, *Turkestan* i, 172.

† S. M. Zwemer, "The Wahabis," *Journ. Vict. Inst.*, vol. xxxiii, p. 311 (1901).

repeatedly shaken Islam, whereas some have been free from it; the world has seen what they can effect when successful, and what becomes of them when they fail. In regarding their founders as re-incarnations of Mohammed these sectarians have a plausible case; for in the greater number of cases these organizers appear to follow the lines laid down by Mohammed with little variation. Instinctively or by study they have mastered that principle of Oriental statescraft in virtue of which men will not readily follow a leader who invites them to pillage and massacre directly, but will readily follow if they are invited to these acts indirectly, as acts whereby a religious doctrine can be furthered, or the true nature of the deity be generally made known. Wahhabism and Mahdism had a great run of success, and the consequences to Arabia and Africa are well known. The restoration of pure monotheism which was the watchword of Wahhabism turned Arabia into a more howling wilderness than it had been before. From the brilliant narrative of Palgrave and the earnest pages of Doughty we learn enough about the character of its leaders and its results to know that it was merely a revival of savagery, containing no element of permanence, and in every way inferior to the Islam of established states. A whole series of authorized works paint Mahdism in its true colours; no greater service was ever done to the cause of civilization than when Lord Kitchener proved that the machine gun was more than a match for an Eastern prophet. The life of the founder of Mahdism in the Sudan, as told by Wingate, gives the standpoint whence the whole series of prophets from Mohammed onwards can be best appreciated; the prophet commences as a saint; after a little success the mask is thrown off, and the career which the prophet's ambition had anticipated in fancy begins to be realized. So soon as the plunder that is within reach has been exhausted, the leaders become divided, and nothing but misery ensues.

Greater value has been assigned to the Babi movement in Persia, round which, owing to the violent measures by which the Persian government endeavoured to stamp it out, a halo of romance has arisen. Of the Bab and his followers many accounts have appeared in English, those by Dr. Sell in his *Essays on Islam*, and by Dr. Adams in his *Persia by a Persian*, being the latest. From these and other accounts it appears that Babism was no more than any other religious movement in the East dissociated from political ambitions; and the

Syrian last mentioned expresses the opinion,* which I know from other sources to be well grounded, that had Babism succeeded it would have been as rabidly persecuting as any other of the sects which have arisen in Islam. A Babi informed me that it would tolerate no religion besides itself; and it would seem that the Christians are taunted with blindness in failing to see that the prophecies of their Bible are realized in the Bab, just as they were taunted by Mohammed for their obstinacy in refusing to identify him with the Comforter promised by St. John. So far as the doctrinal content of Babism is concerned, even admirers in Europe acknowledge its puerile character; the fact that it gives a year of nineteen months is sufficient to show how far the founder was alive to the practical needs of mankind. The general character of the teaching does not appear to differ in kind from that of the Sufis or mystics who have enriched the literature of the Mohammedan languages almost from the commencement, and the literary output of the existing sect seems decidedly outdone in originality and depth by that of the mystics of the sixth and seventh centuries of the Mohammedan era. If their standard of conduct was at any time free from the chief evils attending the Mohammedan system, it is difficult to assert that the amelioration was either considerable or permanent in character; and at quite an early period in the history of the sect they took to settling their internal differences with the aid of the poisoned bowl and the dagger, the style in which Mohammedan dissensions have been settled from Mohammed's time to that of the Wahhabis. Under the present ruler of Persia they exist as a sect that is tolerated provided that it keep in the background; and the errors committed by previous rulers in making it popular by too rigid persecution will probably be retrieved by this sagacious policy.

In the work by Dr. Adams, to which attention has been called, there is a translation of an interesting correspondence between the Babi community in America and the headquarters of the sect at Acre, from which it would appear that acquaintance with the New World is rapidly influencing the sect, in such a way as to change it from a dangerous form of fanaticism to something like one of the comparatively harmless religious revivals, which, not unconnected with mysticism, have repeatedly taken place in the States. One of the writers assures the

* *Persia by a Persian*, p. 467.

Turkish government most earnestly that "the intentions of Our Lord and His followers are only religious and have not the least connection with politics." But when in another document the same writer calls his master "the One into whose hands the kingdom has been delivered and the reins of government have been placed, and for this reason he who disobeys his commands disobeys the commands of God," the Turkish authorities may be pardoned for mistaking their intentions.

Both this writer and others, including such an authority as Lord Curzon, accept the statements made by Babis of their numbers, which according to them should include something like an eighth of the population of Persia. These estimates should be received with some caution, and it seems unlikely that the movement is gaining ground at the present time, even if it is not being displaced by something newer. Even in the East systems which are mainly mystic in character, though attractive to more minds than in Europe, rarely have any power of permanently interesting any number of persons whose approval is of importance; they resemble the rich food which the mature palate rejects for what is more homely, but more nourishing. The new systems which spring up within Mohammedanism are compared by Schweinfurth in a rather brilliant passage* to the showers which occasionally enliven the desert, but effect no alteration in the character of the soil. There is no trace of a movement within Islam having taken place in the nineteenth century which has not its exact analogue in the earlier history of Islam; those movements have, according to circumstances, attained small or large dimensions, have led to much bloodshed or only occasional assassinations, have been forcibly suppressed, or have expired of themselves; the utmost they have been able to effect is the production of some literary monuments of interest, and those of the nineteenth century appear to have been unable to effect even this.

The point from which speculation on this subject should start is the well-known fact that the political ascendancy of Islam is fast disappearing. In 1870 it could be asserted that two-thirds of the Mohammedan world was governed by non-Moslem nations; in 1902 the proportion is nearer five-sixths. Great Britain governs about a half of the Moslem world; Russia and France account for a large slice of the remainder. The states that remain independent are in constant dread of being

* *The Heart of Africa*, ii, 434.

absorbed. The recent event in Fez, where the murderer of a Christian was dragged from an inviolable sanctuary and publicly executed without delay, illustrates the fear felt in barbarous regions of Islam lest any provocation should accelerate invasion by the irresistible Frank. But though the date cannot be precisely calculated at which the last shred of political power is taken from Islam, the course of events seems to presage that it will not be distant.

Such a state of matters was never contemplated by either the prophet or his followers. God had, they thought, determined that Islam should have the upperhand over all religions; the world was to be divided into a Moslem caste, who should rule the others; a caste of adherents of tolerated religions; and a caste of unbelievers who were to be exterminated. The sacred war was to be maintained till Islam had engulfed the world. In out-of-the-way parts of the East this prophecy is supposed to have been fulfilled. But even from early times there were exceptions to the rule that the Moslems everywhere should be the ruling section of the population; and in the present day the portion of the world in which there is any room for the development of Mohammed's scheme is vanishingly small. Islam, if it is to exist, must learn, as Christianity has learned, to divorce itself from political ambitions; and the greater part of its law has to give place to one based on the principle of treating all men as equal.

A large portion of the Islamic code is of course abrogated at once—its unjust dealings, its barbarous punishments, its senseless restrictions. If slavery be an essential part of Islam, that essential element is also doomed to destruction; each year finds the pursuit of the trade less practicable. The study of the portions of the code which deal with these matters becomes therefore an academic study, as harmless as the Jewish study of the four modes of execution which the Sanhedrim may order, where there is no Sanhedrim with any power of ordering them.

But does it follow that the content of Islam left is insufficient to constitute a religion when civil government has forcibly abrogated large portions of its code? Probably one who regarded a Mohammedanism that was shorn of slavery, polygamy, and fanaticism, as no Mohammedanism, would be justified in thinking that we are near the end of the system; but one who looked only to historical continuity, and disregarded even vital alterations in an institution that was historically continuous, would fancy Islam has still a long life before it. For the results of present experience appear to show

that even when shorn of its characteristic institutions it can retain enough to satisfy such need of religion as ordinarily enters into the life of an individual or a community; and that the loss of some of the privileges of the system when it was victorious does not result in its followers either abandoning it, or adhering fanatically to the precepts that remain.

Of slackness of nominal belief in Islam it is easy to quote evidence from many parts of the world. Mr. Schuyler* observed that owing to the exclusion of missionaries from Tashkent Moslem observance had become lax; and since, owing to the action of the Russian government, compulsory attendance at mosques has been abolished, attendance is rare. The customary ablutions and performances which are called prayers are getting into desuetude. Dr. Pruen† testifies the same for East Africa; in Palgrave's time it held good of Arabia itself, but there would appear since his time to have been some movements in the opposite direction. In Egypt and India it is not difficult to find Moslems who make no concealment of the low esteem in which they hold the rites that their ancestors prized, though they have no intention of leaving the Moslem community.

The question whether the European standard of conduct and principle is making any way in these communities is of great importance, and it is especially of interest to compare the statements of modern observers with those made a generation ago by Vámbéry, whose practical acquaintance with Moslem countries was unique. In his charming work on Islam in the nineteenth century he gave a history of the attempts that had till then been made to introduce European civilization into Turkey, Persia, and the Mohammedan East, and he told the reader not to condemn the Mohammedans prematurely as incorrigible, because these attempts had in the main been failures. In spite of the gloomy character of the narratives in that work, and the author's harsh condemnations of the methods and abilities of the Oriental reformers, the reader is less struck by their failure or their incompetence than by their number and their earnestness; if the Turkish and Persian rulers failed to make their countries European, it was clearly not for want of trying, though, like those who attempt to draw, they may have made many unsuccessful drafts in attempting to get a resemblance. In reading very recent works on Turkey the

* *Turkestan*, i, 162.

† *The Arab and the African.*

reader finds that in some matters at any rate, which when Vámbéry wrote no progress had been made, the present condition exhibits very decided advance. Thus Vámbéry declared that the ideas of Europe never got beyond the Salamlik, or reception room; that the Turkish womankind were absolutely unaffected by the reforms, and he supposed the reforms must always remain superficial, because the earliest years of the lives of the men were spent in the society of mothers who were rigidly conservative, and to whom all things European were objects of contempt and detestation. A lady who wrote on Constantinople in 1895, Clara Erskine Clement,* testifies that Turkish ladies now study music, language, embroidery, and other feminine accomplishments; and the same is admitted by Dwight in the yet more recent work from which quotations have been made. In native Turkish novels the ladies are made to perform brilliantly on the piano, and to speak French with ease and discourse on European literature. A distinguished Turkish authoress,† Fatimah Aliyyah, in the preface to one of her translations from the French, speaks of this style of work as a departure in accordance with modern ideas, and hopes that she may be imitated by her countrywomen. This lady has composed some novels of her own, and has also given her countrymen some more serious literature, including a biography of philosophers. Feminine authorship has at all times been more common in Mohammedan countries than would naturally be supposed; it is however interesting to be able to hit on a point in which Vámbéry's Constantinople was certainly behind the city of to-day. It would also appear that the literature in circulation among readers of Turkish, not only at Constantinople, but in the provinces, compares favourably with what we should find in the bookshops of a European capital or provincial town. From what I have been able to see of the works employed for instruction of the young, Vámbéry's severe criticisms on the unpractical and reactionary character of the instruction would not now be justified.

For social regeneration I look to the working of one particular evangelist—one that may appear strange in this context, but yet of considerable efficacy. That is the French novel. In Turkey it is well known that the French language is studied with enthusiasm, and those who obtain government appointments of any importance are ordinarily accomplished

* *Constantinople*, p. 253.

† *Maram*, A.H. 1307.

French scholars. Hence some sort of acquaintance with French literature appears to be common in educated circles, and books of criticism mainly dealing with French literature are published in Turkish and widely read. Such works assume an acquaintance on the part of the reader with the literature whose beauties they point out, or whose characteristics they analyse. French novels are also translated in masses into Turkish, somewhat on the scale in which they are rendered into Italian: and owing to the cheapness with which books can be produced from Oriental presses they are widely read. Thus at a Turkish bookseller's it is possible to procure not only translations of those works which are regarded as part of the literature of Europe, but also of works of fiction of ephemeral interest, which, as those who are acquainted with such works are aware, have a tendency to follow rather stereotyped lines. With the immediate moral effect of these works I am not at present concerned; nor with the taste which they represent. But what is important is the state of feeling on domestic matters which they assume; the condition of the society on which they are based and which they doubtless faithfully portray. That condition is the outcome of centuries of Western civilization, absolutely distinct from the Mohammedan system, which, as instituted by the founder of Islam, differed only for the worse from that of idolatrous Arabia. The romance which fills the *feuilletons* of the Turkish newspapers, which provides the literature of entertainment and repose, is the romance as the European conceives it, of which the environment is the European family, with its ideas of women and men which differ so utterly from those which were realized in the capitals of the Umayyads and Abasids, and of the Osmanli's before the introduction of French influence.

When the Turkish stylist endeavours to imitate the same style, he is compelled to adapt himself to this European environment; without it it is impossible to obtain the motives by which scene can be made to follow scene, and complication to lead to *dénouement*. The institutions of Islam have in a way to be strained, ingenious combinations have to be devised, in order to permit of the construction of a romance in the French style at all. It must also be remembered that much of the French literature that is translated is from the prudish point of view absolutely unobjectionable: it is of value in respect of the morals which it is intended to inculcate, not only in virtue of the environment which it necessarily assumes. It is rare that religious motives enter into this literature; what it assumes is not so much the standard supposed to be inculcated by a church,

as the standard which fashionable society at the great European capitals is thought to recognize. Hence we find original Turkish romancers introduce into their own civilization such European inventions as the bride's white satin dress or the wedding tour. The Turkish lady of these ideals is made to possess the accomplishments of the European lady of fashion; the standard of etiquette is gradually transplanted from the West to the East.

For several purposes what is fashionable is of greater consequence than what is right. It is possible that many of these books are what Horace would call *peccare docentes historiæ*; but the standard from which they are intelligible is the European standard of what is right and wrong; whereas the state of society assumed in the native romances perpetuated by the Arab storytellers is the barbarous standard of the Caliphate. The French novel appears to be performing the tremendous service of revolutionizing taste in the Turkish empire, by representing the social conditions which we connect ordinarily with Islam as barbarous and unknown to the fashionable world. In the Turkish and Arabic literature that proceeds from the pens of Mohammedans who have allowed themselves to be taught by Europe, the advance on the style of older times is as great as that which the English literature of the present day exhibits over that of the eighteenth century. Probably other European literatures are now exercising their influence besides that of France. Since the interest taken by the German empire in Turkey, German literature has begun to penetrate there also; and the works of English writers are also invading the East in Turkish or Arabic dress. The works by which the people are morally educated are everywhere those which they read for pleasure, in which the instruction is conveyed without intellectual effort, and the perusal of which neither constitutes a study nor interferes with work. And from the education of the Mohammedan world by the novel literature of the West, radical reformation may be expected.

Lastly, it remains to be seen whether Islam will be able to claim for its own what it derives from Europe; whether, as has sometimes happened, the discoveries in ethics which are the product of experience, will be able to be represented as the outcome of the national religion. Mr. Schuyler, the excellence of whose judgment his readers have often occasion to admire, points out with justice that art and science, which we now associate with Christianity so closely, were at one time regarded as its enemies; and so seems to regard it as con-

ceivable that Islam may one day be not only reconciled with them, but even become their protector. We might similarly point to the insurance office being now regarded as an institution likely to be found in a Christian country; and yet the notion of providing to the utmost of our ability against any contingency that could befall us on the morrow, might seem to violate essentially the precept which forbids us to take any thought for it. At a recent Oriental Congress a Turkish gentleman read a paper proving that religious toleration was from the first the watchword of Islam; in a popular life of Mohammed there is a chapter headed "Islam not propagated by the sword"; and ingenious writers have made the prophet himself an advocate of monogamy. From the point of the student of history these propositions are indefensible; but where a biography is what is called dogmatic, where the actions of a man are regarded as the pattern for other men's, and where reverence for a particular name constitutes a mass of political capital, it is more important for the race that his life should be really exemplary than that it should be faithfully recorded. What shocks us about the earliest biographers of the prophet is that they are so truthful; they produce a picture that is entirely black, and fail to draw the obvious inference that such a man deserves little but reprobation. The newer biographer, who has learned from Europe what a pattern of conduct should be like, paints his prophet in a style that brings him near that pattern; he hopes to make him the patron of the newly-discovered virtues, just as moral and metaphysical speculators of earlier times made Mohammed the patron of their business. These efforts at re-writing history are not to be discouraged, though with advancing years men choose living models of conduct rather than those of which the traits are blurred by antiquity.

If the transformation of Islam into a patron of purity, toleration, intellectual and artistic originality, be equivalent to the destruction of the system, it is an end which, though far from realization yet, by no means lies out of the direction which Islam in some places at least is taking. Yet the course of events so often stultifies the most careful forecasts that it can only be suggested as one of many possibilities, but probably as that which will require the smallest amount of violence for its realization.

DISCUSSION.

The CHAIRMAN.—Ladies and gentlemen, we have had the great privilege and pleasure of listening to a very able and learned address on the "Future of Islam." I think, by your applause, you have anticipated the proposal I was going to make—that we should give a hearty vote of thanks to the distinguished lecturer.

Mr. MARTIN ROUSE.—I beg to second that proposal. I think we have all been highly delighted with this deeply-scholarly, thoughtful, and well-reasoned paper.

[The vote of thanks was then put to the meeting and carried by acclamation.]

The SECRETARY.—I have received several written communications on the paper.

We have received communications from Chancellor Lias, the Rev. G. F. Whidborne, Dr. Chaplin, and Dr. Klein. It would be impossible to read them *in extenso* without unduly curtailing the time for the discussion. They will appear in the next volume of "Transactions."

Professor ORCHARD.—The learned author has, I am sure, put us all under an obligation by this valuable and thoughtful paper on a very important subject.

I notice that he refers to the opinion of von Kremer, "that Islam must at some time become the religion of the whole of India." That may be the opinion of von Kremer; but I think it is not shared by those who have the opportunity of forming correct conclusions on the subject. Certainly the Rev. G. T. Manley, by his mathematical training and also, still more, by his experience as a missionary, is entitled to be listened to on this point, and he does not share that view. Quite lately he has pointed out that the Hindus themselves do not fear the Moslems being so numerous; but their belief is that the Christians, though comparatively a small community, are a real danger, and they look with apprehension to the possible spread of Christianity. Of course it is true that the number of converts is small. That, no doubt, is very much owing to the fragments of truth in the Mohammedan creed. They have the grand truth of monotheism. That is one reason why it is so difficult to make converts from them.

Then, again, I notice the author points out another cause which has had some effect, and that is, as he says, "in several of the

places where Mohammedans are subject to Christian governments, missionary work is prevented or discouraged by the authorities." That is undoubtedly the case; for instance, in the North-West Provinces of India, where a friend of mine is working, they are very much hurt by the action of the authorities in regard to missionary work. The authorities may mean well by it, but one cannot but think that they are making a great mistake.

If you show to these Mohammedans that you are afraid to meddle with their false religion, how is it likely that they will believe that you greatly estimate the truth and importance of your own? (Hear, hear!)

I concur with the learned author in what he says about the so-called "higher criticism." If you have not a book in your hand—a book every whit as good as the Korân is to the Mohammedan—how can you expect that they will give up their cherished belief in their book? If the Bible be not the Word of God, the power of the missionary is gone, for it comes not with Divine truth, supernaturally communicated, but merely as human opinion, which may be true or false. That sort of thing will never satisfy the heart and mind of man, which yearn for truth, and yearn for authority.

Lieutenant-Colonel MACKINLAY.—Professor Margoliouth has told us of the changes in Mohammedanism, many of which have been largely brought about by the loss of political power.

With the probable fall of Turkey and Morocco in the future, this loss of power will, as he says, ere long be greater still. It is not unnatural to suppose that the condition of the Mohammedan world in general will, in the future, follow the same general lines of change as those which have already appeared in Mohammedan countries (such, for instance, as India), which have been governed for years by alien rulers. In India it is found that the social progress of Mohammedans during recent years has been slow as compared with that of Parsees and Hindoos. The former have shown a relative inaptness to accustom themselves to new surroundings; they have not taken so readily to the arts of peaceful progress, and education is backward among them; only a small portion of the young Indian students in England are Mohammedans. While Parsees and Hindoos are numerous on the Bombay Town Council, the number of Mohammedans is very small. They still, of course, make excellent soldiers. On the other hand, during the last twenty or thirty years

they have, it is believed, become less strict and bigoted in the observance of their religion, and Western ideas have influenced them, though not apparently to the same extent as has been the case among their co-religionists of the higher classes in Constantinople.

With regard to Missions. Mohammedans in India have not hesitated to include the Christian religion among the subjects of their numerous public discussions. I remember thirty years ago meeting Imad-ud-deen in Umritsur in the Punjab; he had been a bigoted Mohammedan, and he was consequently chosen as a champion in a discussion with Christian Missionaries. He procured a New Testament on purpose to find fault with it; but on reading it prayerfully by himself, he was convinced that the Lord Jesus Christ is the Son of God, and he became a Christian. A somewhat similar instance occurred some years later when another discussion took place at Umritsur; a very earnest Mohammedan was again one of the champions of their cause. He was summoned from Afghanistan for the purpose, and was so strict in his religion that he had gone to live there simply because he wished to be under a Mohammedan ruler. As the discussion went on, the Mohammedans lost their tempers, but the Christians kept theirs. This difference of behaviour so impressed the Mohammedan from Afghanistan, that it led him to look further into the subject, and he too became a Christian. Such public discussions must have considerable influence on those who still retain the religion of the false prophet.

It is interesting to compare the condition of things at the present time in such a country as India, with, say, Morocco, where Mohammedans still have political power.

Probably there are those present who could give us facts from personal knowledge, and these facts would help in the formation of a forecast for the future.

Mr. J. Hill Twigg.—There is a point on which the lecturer might give us some idea, that is, the degree by which Mohammedanism is kept back by extreme veneration for its classical Arabic, and the difficulty that a great part of a man's life must be spent in learning the Korân.

With regard to the extent to which conversion is progressing, I have never known a convert in my experience. I have met a missionary of twenty or thirty years' standing, from Western India, and he told me the same thing. The distinguishing point which

binds Mohammedans together is the unity of God, and they accuse the Christians of believing in the partnership of Christ, which they look upon with extreme contempt. Those are the main points of the religion, and they have, I suppose, a greater hold on the lower orders than the higher. They infuse a Mohammedan spirit that keeps out Europeans, and it is striking what immense military enthusiasm and power a man receives when he becomes a Mohammedan.

Dr. HERBERT LANKESTER.—With regard to the question of conversion, we had at the Church Missionary Society's Hospital at Quetta a lady missionary who went out five years ago. She told us that the only one woman then converted was a Parsee, and now they were twenty-nine in number, most of whom were brought to Christ through that hospital; and she said they were not mere nominal Christians, but were really striving to win their fellow women to Christ, and that some twelve or fourteen women were under instruction.

Some time ago, when there was a rebellion in Uganda, some native troops were sent for to come to Quetta, and they asked for copies of the book. They went up through the different tribes till they got to Uganda. They saw there what an extraordinary change had taken place, and they were told it was through the book that the Christians could read; and they came to our Medical Mission at Quetta to ask for copies of the book. They saw so much difference between the tribes along the coast of Uganda and those they found in the country itself.

Mr. MITCHELL (lay missionary of North Africa).—I think I might say there are hundreds of converts amongst the Mohammedans of Morocco, and yet such a traveller as Francis Macnab, or such a writer as Cunninghame Graham, might travel extensively through the country without coming in contact with them at all, for the reason that they are secluded to some extent. I will not say that they hide their light, but they keep it to themselves among their own people, and the missionary societies have to be very careful in publishing statistics or in mentioning any facts that would lead to the identification of those converts. Many of them are soldiers in the Sultan's army. Some of them have already laid down their lives for Christ; one was not long since flogged to death for refusing to acknowledge Mohammed and to abandon Christianity. So both these statements may be honest, and

Mr. Atterbury is correct when he says that a missionary stated there were many who were converted from Mohammedanism to Christianity in Morocco, and yet you may travel in Morocco without hearing anything of them.

Another thing—I believe that most of these converts are made from the Berbers, who speak a different language, and they would be very careful to hide anything from the Arabic-speaking people with regard to such a thing as the spread of Christianity in their midst.

There is one thing I should like to say in regard to the future of Islam, and that is—we, as Christians, are inclined and glad to think that the political power of Islam is passing away, and to congratulate ourselves that a large part of the Mohammedan world is now under the dominion of Christians. But there is another side to that. Mohammedanism under native rule is decaying rapidly. I have been a missionary for many years in North Africa. In the twelfth century the population of the province of Tunis was some 17 millions. Now, under Mohammedanism, without any rival, and with considerable means of increasing their numbers through piracy and bringing up slaves from the Sudan, what has been the result? With no native Christian church to oppose them, from 17 millions of people living in a rather prosperous country, the population of Tunis is reduced to less than 2 millions, decimated every few years by famine. That is the case in Morocco. I would like to say that Mohammedanism under European powers, such as India and Egypt and other parts, has the opportunity of progressing and has the opportunity of striking its roots deeper under European Christian powers than under native rule.

I cannot, of course, help regretting the action of the Government in Egypt in refusing to allow Christian missionaries to penetrate farther into the Sudan. I think it is the worst thing that could be done from a political and religious point of view. I believe a Gordon Khartoum College might have been established deliberately as a missionary system to propagate Christianity in the Sudan, and that it would have met with respect from the natives.*

* Since the above words were spoken it has been stated in the papers that Lord Kitchener and the Sirdar have allowed the C.M.S. Society to open Christian schools at Khartoum; the rights of parents to prohibit their children receiving religious instruction being respected.—Ed.

Mr. MARTIN ROUSE.—To what Mr. Mitchell has just told us I think I might add a fact learnt from a lecture that I heard Mr. Mitchell give a few years ago, I think—that in Morocco a certain lady was the pioneer in one of the leading towns, and gathered young men around her and led about ten of them to Christ. Three of them went away into the mountain villages of Morocco; and they preached with such real and hearty belief in the doctrines of the Bible, that the inhabitants of three villages renounced Mohammedanism and became Christians. But I remember that at that time we were told not to say much about these things, lest the Christians should become marked men.

The SECRETARY.—I have an extract from a newspaper of the 19th December last, containing a statement regarding the spread of Christianity in India, drawn up by the Committee of the Calcutta Missionary Conference lately held. The whole article is exceedingly interesting, but I would just read one part which bears specially on that subject:—

"The first impression left on the mind by its perusal is that of enormous and rapid success. In 1861 the Asian Christian community in the Protestant Missions of India proper was 138,731; in 1900 it had risen to 854,867, a growth of more than 600 per cent. in forty years. If we include Burmah and Ceylon, where the growth has been less rapid—in Ceylon, indeed, the Christian community has fluctuated curiously—the total number of Native Christians in Protestant Missions has risen from 213,373 in 1861 to 1,012,463 in 1900, a growth of 474 per cent. During the last decade the numbers rose from 671,285 to 1,012,463, or nearly 51 per cent. Satisfactory in itself, this advance compares favourably with the general increase of Native Christianity. The Census of 1901 is sufficiently near in date to afford a means of comparison. In that year the number of Native Christians in India and Burmah was returned as 2,664,313, as against 2,036,590 in 1891, a growth of about 31 per cent. If we disregard the small numbers in Ceylon, a simple calculation shows that whereas the Native Protestant community has increased some 51 per cent. in the decade, the rest of the Christian community has only advanced about 22 per cent. In other words, the rest of the Native Christians, including members of the Syrian Church of Malabar, the remains of the old Roman Catholic districts, and the like, are comparatively stagnant. In the gross the numbers of Indian Christians are still insignificant, compared with the millions of Hindus, Mohammedans, Buddhists, and Animistic worshippers. The Mussulmen increased more than 5,000,000 during the decade; the Buddhists, chiefly in Burmah,

added over 2,000,000 to their adherents, though the number of Hindus and Animistic religionists have actually fallen. Compared with a total population amounting to 294,000,000, the increase of the Christian body seems trifling. But the accelerated movement towards Christianity is overtaking the natural increment of the population. In forty years' time, even if the ratio of increase be not improved, Christianity will have surpassed all other religions but Hinduism and Islam, and will have taken its place as the third religion of India in point of number."

Mr. CHARLES ODLING, C.S.I.—I would say, first, that a large number of the Mohammedans in India with whom I have been acquainted thoroughly believe in Mohammedanism, and are very good business men, as anyone who deals with them soon finds out! (Laughter.)

The second point I would refer to is, that one element I find in India is not so much the unity of the God-head as the brotherhood of mankind. A man admitted to Mohammedanism is the brother of all other Mohammedans.

Rev. G. B. DURRANT.—May I say with reference to the paucity of converts from Western India, that may be due to the fact that there is no really determined effort ever made to bring over Mohammedans; but in Northern India there are some of the best examples of conversion amongst the Mohammedans. It may not be known that in India, in connection with the Church Missionary Society, there are flourishing Christian Churches, ministered to by clergy, converts from Mohammedanism.

The CHAIRMAN.—I was rather struck by the analogy given by the author, where he quotes a missionary as prophesying "that Mohammedanism would probably melt away like a frozen iceberg."

The author says, "a Babi informed me that it [Babism] would tolerate no religion besides itself; and it would seem that the Christians are taunted with blindness in failing to see that the prophecies of their Bible are realized in the Bab, just as they were taunted by Mohammed for their obstinacy in refusing to identify him as the Comforter promised by St. John."

Professor MARGOLIOUTH, in reply, said, I have learnt a good deal from the speeches that have been delivered. I am rather glad to find that, as far as I am aware, no statement of mine has been actually controverted by speakers of experience.

One observation was made on the subject of the Arabic language, and the difficulty of the study of the Korân. That interested me, because a short time ago I was talking to a man of experience, and he said he thought the reason why, in ordinary life, Mohammedans do not get the places they seek, was that a considerable part of their youth was spent in learning the Korân, and he thought it was an useless burden on them, as they did not understand it, to learn it merely by rote, and that that mechanical labour unfitted them for business habits. I have no doubt that what he said was based on correct observation. It seems to me, so far as I am acquainted with Mohammedans, that too much study of the Arabic language does injure them. It seems to be so in Persia, and Turkey, European and Asiatic, where profound knowledge of Arabic is not common. Even in Egypt and Syria the study among Mohammedans is often confined to committing to memory a few books. So I do not think the Arabic language is to blame; but, I believe, they are badly taught it, being taught to learn the words without their meanings.

I understand from friends that great alterations are being made in the way of a better course of study, which may develop better results. (Applause.)

The Meeting then adjourned.

Communications.

The following communications have been received:—

From the Rev. Chancellor Lias:—

The Institute is to be congratulated on the able paper by Professor Margoliouth which has been read before it. I send a few remarks by way of supplement.

In the first place, as the late Professor Freeman was never tired of saying, one great reason of the social and political failure of Mohammedanism lies in the fact that it spread, not by discussion, but through the power of the sword. Though it was associated with rapid and remarkable intellectual progress among the races in which it originated, it aimed, not at the elevation of the peoples which it subdued, but at their suppression. With a military

occupation it commenced, and after centuries had elapsed, a military occupation it still remained. This circumstance would alone account for its failure to civilize and to develop peoples as Christianity has done.

Beside this cause, however, there is another; I allude to polygamy. The ruling classes in Mohammedan countries are brought up in the atmosphere of the harem. Mohammedanism has no respect for woman, but degrades her into the slave of the lusts of man. The future ruler of men passes his infancy and childhood among women, who, as a rule, have neither minds nor morals, and around him he sees nothing but ignorance and intrigue, and from his earliest years he is accustomed to self-indulgence, which, as he grows older, is often of the basest character. He emerges from his seclusion without a single one of the habits which are necessary for a governing race: neither self-control, nor honour, nor honesty, nor justice, nor even mercy. Wherever he goes he is surrounded by parasites; and peculation and favouritism dog his steps.

The reason for the moral supremacy of Christianity is the grandeur of the moral ideal which it sets before mankind. Here, certainly, "the best is" not "the enemy of the good." Experience has proved that the nobler the moral ideal in a nation, the greater is its moral strength. Still more is this the case when, as in Christianity, religion not only provides the noble ideal, but supplies the strength which enables us to approach to it. Even sceptics like Mill and Lecky have admitted the grandeur and beauty of the character of Christ. And when we add to the inspiring character of His example, the fact that in the case of those who put their faith in Him He inhabits them by His Spirit, we find the secret of the elevation of soul, the loftiness of spirit, which exist where the Christian Church is found. The devotion to duty, the absence of all low and selfish motives which the best men in every Christian State display, is the result of a religion which has for its basis the incomparable Sacrifice of Christ, and the fact of the outpouring of the Spirit of that Sacrifice into all who believe on Him.

From the Rev. G. F. WHIDBORNE:—

It appears to me that Professor Margoliouth's paper is most important, in the view it presents of the outlook of Islam, and the more so because he rather presents facts than draws conclusions.

I venture to think, however, that in comparing it with the endemic Christianity of such countries as, for instance, Abyssinia, he hardly gives sufficient weight to the decadent condition of those churches. Islam is itself largely the product of dead churches; and until those churches are reformed and revivified it is not surprising that they do not show much greater vitality than Mohammedanism itself. But where we get a pure form of Christianity the case is different. In India the latest statistics show the rate of increase of Protestant Christianity to be 50 per cent. as against the 20 per cent. of Mohammedanism; while in Uganda, where the two religions started almost together, Christianity has beaten Mohammedanism completely out of the field.

I venture to think, too, that he has underestimated the vital force of Christian missions. He quotes, as a sign of their comparative failure, cases where for years the Missionaries have not made a single proselyte. But the object of Missionaries is not to make "proselytes" as such, but to spread the Gospel. The work in Palestine is, I think, a good exemplification of this difference. There a formal proselyte is rarely made, but yet the Gospel is undoubtedly now permeating the land in a way that seems to predicate, ere long, surprising results.

The dead weights of Moslem tyranny appear to bar the progress of Christianity at present. In the Turkish Empire there is the bar of Government tyranny. In India and Egypt, where that bar has been removed, the bars of social and family tyranny remain. But the spread of Western civilization (a product of Christianity) is distinctly weakening these hindrances. It has yet to be seen what the rate of Christian advance will be when it has "free course": vital Christianity has a power of surmounting bars!

I note with interest that the Professor remarks, "of persons who are virtually Christians while remaining Mohammedans I have heard a good deal." This seems by no means impossible. It is not impossible for human beings to hold at the same time two contradictory beliefs. It is by no means unusual for Christians to grasp the truth, while still professing a large amount of adverse error. And especially in the ill-trained minds of ignorant and child-like races, such as may be found in the East, it is not to be wondered at if the Gospel strikes home to the heart without always gaining logical ascendency over the intellect.

No doubt this latter phase of mind would, as the Professor so forcibly points out on page 65, if it became widely developed in the Christian churches, produce a most serious paralysis of Missionary work. But the truths of the Bible seldom fail permanently to influence the minds and conduct of those who have opportunities of studying them in search of the truth.

From Dr. THOMAS CHAPLIN :—

The paper of Professor Margoliouth opens up a question of the highest importance and interest, whether regarded from a political, social, or religious point of view. As might be expected from a writer of the author's great ability and attainments, he has treated it in a most lucid and masterly manner, and I could not venture to add anything to what he has said, were it not that daily intercourse with Mohammedans for a quarter of a century, and more or less association with them for nearly double that period, has enabled me to gain some insight into their thoughts, and aspirations, and expectations as to the future of Islam.

About the year 1880 there began amongst Moslems of the upper class in Palestine and Syria a remarkable movement in the direction of Christianity. Young Effendis took to studying the New Testament, and eagerly sought opportunities of discussing with European Christians the proofs and claims of Christianity. Opposition of course arose, and anti-Christian feeling ran so high that the acting British Consul in Damascus was hooted in the streets and had to flee to the coast. The late Sir Richard Burton, who was then on a visit to England, took great interest in the movement, and it was from him I first heard of the strangling in the Great Mosque of a Mohammedan gentleman who was suspected of being a Christian—the Moslem account of the occurrence was that he committed suicide out of remorse. But the movement was not stopped. The unrest continued, until the revolt in Egypt under Arabi Pasha broke out. This was regarded as a defensive Mohammedan effort directed against the ruler of that country, because he was looked upon as being too much under the influence of foreign Christian powers, just as at this moment Bu Hamara is fighting against the Sultan of Morocco for a similar reason. Every strict Moslem was secretly or openly, partially or wholly, in sympathy with Arabi, and no Mohammedan dared let it be suspected that he

had any tendency towards Christianity. Probably nothing that has occurred during the last fifty years has so much tended to hinder the acceptance of Christianity by Moslems as the revolt of Arabi and its suppression by Christian agency.

And here we are face to face with what is perhaps the chief of all the influences which prevent the Moslem from embracing any other religion than his own. He believes it to be the destiny of Islam to dominate the world, not necessarily to convert it, and in his heart of hearts regards the world as in a state of war (Islam against the world), the progress of the Moslem arms being arrested for a time owing to the sins and unfaithfulness of the believers.*

The simplicity and brevity of the Mohammedan confession of faith, and the absolute and indefeasible title to a place in paradise which it assures to those who adopt it, is another cause of the Moslem's strong attachment to his religion, especially when he contrasts it with the elaborate and disputed creeds of the Christian Churches. Probably no religion ever invented makes the way to heaven so easy as the religion of Mohammed.

Another strong point is that there is no order of clergy in the Mohammedan system. From a religious point of view one Moslem is as good as another, unless by his character, conduct, or learning one obtains a reputation for superior sanctity. The Imâms, or leaders of public worship in the mosques, are often small shopkeepers, and in Egypt, in Lane's time, received from threepence to fifteenpence a month for their services. They have no spiritual authority, and may at any time be dismissed and replaced by others: yet, if I am not mistaken, there are instances in which the office of Imâm has continued for several generations in the same family. It is the proud boast of the Moslem that no man can come between his soul and his Lord; that the meanest slave who has accepted the faith of Islam is spiritually on an equality with the highest and noblest.

Doubtless also the indulgent character of the Korân with regard to marriage, divorce, and concubinage are themselves indirectly a

* The famous Hattí-Scherif of Mustapha II, Sultan of Turkey, began with these words: "God, the supreme distributor of all good, has granted unto us, miserable sinner, *the Caliphate of the whole world.*" This was preliminary to making war upon Austria.

hindrance to the Moslem who approaches the subject of Christianity. The strictness of the marriage laws of the Christian Church is regarded by him as a stumbling block opposed to the impulses and requirements of nature, and leading indirectly to unhappiness and sin. He shrinks from it therefore as, in his opinion, antagonistic to the best interests of humanity, and not necessarily because of his own greater tendency to sensual indulgence. According to my own observations, very few Moslems avail themselves to the full of the liberal laws of Mohammed.

These four things form a stupendous barrier to the progress of Christianity amongst Mohammedans, and have to be fully reckoned with in considering the question of the future of Islam.

Of course other circumstances also have great influence. The unattractive character (to the Moslem) of much of the Christianity which he has opportunities of observing, especially the use, not to say worship, of pictures and images in churches, which he cannot distinguish from idolatry; the traditions of the Crusades and their final failure; the fact that Christian Powers are constantly encroaching upon Moslem domains; these all tend to foster in him opposition to and hatred of the doctrines and claims of Christ. It should be remembered that to the Mohammedan his religion stands in the place of patriotism. Few care for their country in the way that Christians care for their country, desiring its material prosperity and intellectual and social advancement. The Moslem only wants to be let alone, and live his own simple, but too often immoral and cruel life, to inhabit a region which he can defend against the hated Christian, with his civilization, and science, and intellectual activity. Nothing is so distasteful to a pious Moslem as any attempt at free inquiry into the grounds of his religious belief.*

Yet there is another side to the picture. Many educated young Mohammedans are questioning with themselves whether this religious system is not in process of decay; whether it is not too

* A well-known writer has observed that Mohammed accustomed the newly converted Moslems to reflect, and accustomed their descendants to surrender their reason. The latter had to regard the doctrine and laws of their religion as for ever fixed. Sismondi, *Chute de l'Empire Romain*, 3rd ed., Bruxelles, 1837, p. 308.

much opposed to the progress of enlightenment to hold a permanent place. To them the ground seems slipping from under their feet. They are thinking, doubting, and fearing what the future may bring.

It is perhaps difficult for us to examine this question with entire intellectual detachment. We are taught, *and believe*, that the kingdoms of this world shall become the kingdoms of our Lord and of His Christ. Possibly a sudden supernatural impulse from above may so influence the hearts and minds of the followers of Mohammed, that they may willingly yield themselves to the obedience of Christ. But this is hardly a subject for discussion at this meeting.

POSTSCRIPT.—In these hasty and imperfect notes I have assumed that if large numbers of Mohammedans were induced to change their religion, it would be to embrace Christianity. Hinduism, Buddhism, or the native religions of China would hardly attract them. Ancestor-worship might have a certain charm for them, but could not constitute a religion. Mohammedans, especially those of Arab origin, have ever shown a remarkable tendency to revere fanatically and follow enthusiastically religious leaders, as in our time, Senoussi, the Mahdi, the Mullah, whom we are pleased to call "mad," and perhaps Bu Hamara. If what is related be true, the reverence of the early Moslems for their prophet was almost idolatrous. "Is it Mohammed, or the God of Mohammed, you worship?" exclaimed Abubeker, in his anger: "the God of Mohammed liveth for ever, but the Apostle was mortal like ourselves, and is dead."

From Mr. S. T. KLEIN:—

I have read Professor Margoliouth's paper with great interest: it deals with a subject which is intimately connected with the spread of Christianity; in fact, I believe it can be shown that Mohammedanism owed to a great extent its very existence to the zeal of early Christians. It may seem strange to look upon Mohammedans as themselves an offshoot from the ranks of Christians, and yet in their early days they were, in belief, quite as near as some of the other so-called Christian sects. It is not generally known that the reason why the Mohammedans removed their Kibleh from Jerusalem to Mecca was because they quarrelled with the Jews over their belief in Jesus Christ; at this very time there is in Jerusalem a memorial

of this in the Golden Gate, leading to the Temple area, which has been bricked up by the Mohammedans because they said "no foot shall cross over that portal until Jesus Christ comes to judge the world." This belief in Jesus Christ gradually gave way, and was supplanted by their belief in Mohammed, as he gained in power; but I believe it more than probable that Mohammed would have had no considerable following had it not been that the promulgation of the dogma of the Trinity, and its being misunderstood by the masses, gave Mohammed the handle by which he drew hordes of Semites into his train, and gave them their battle cry, "There is but *one* God." I was struck very much with this idea whilst looking through the old Moorish MSS. at the Escurial Library in Spain. In the account of their fights with the Christians the Moors do not refer to them as *Christians*, but they say, we, the true believers, fought a glorious battle and overthrew with great slaughter the *Polytheists*. It is not pleasant to contemplate how different civilization and religious thought throughout Europe would probably have been now but for the victory of Charles Martell over the Moors at the battle of *Tours*.

As civilization spreads, and races become educated to think individually, the power of Islam must, I think, lose vitality, and in these days of telegraphs, steam engines, postal communication, and spread of knowledge throughout the world by the Printing Press, 200 years does not seem too short a time to see approaching the vanishing point of Islamic perspective, the point where it once more comes into line with Christianity. The tendency of religious thought to become more liberal in the matter of enforcing dogmatic teaching seems to me to be in favour of Mohammedanism eventually being absorbed into Christianity; for as the misunderstanding of a dogma helped to start the great wave of Mohammedanism, which in the sixth to ninth centuries overran the whole civilized world, and Islam became then the exponent of civilization, so Christianity, which has now become the great civilizing force in the world, may, by the better understanding of certain dogmas, become indeed a light clear enough to lighten every Gentile race, and simple enough for every mind to understand.

SECOND POSTSCRIPT BY DR. CHAPLIN.—It is a mistake to suppose that the religion of Mohammed has been wholly, or even

mainly, propagated by the sword. Islam as a *power* has indeed been so maintained and extended, and in every age semi-barbarous peoples have shown themselves more or less ready to embrace the religious system of their conquerors and rulers. The law of the Korân is that no force shall be employed in religion (Chapter 2), and although this law has not always been observed, especially as regards Arabia, for instance, the rule generally in force has been to offer to conquered peoples the alternatives of conversion, tribute, or death.

Another misconception is that Islam does not treat women with respect, and regards them merely as slaves of the lusts of men. This is not so. " Women's rights " were safeguarded by the Korân more than a thousand years before they were much thought of in England. It is true that polygamy is allowed, and divorce permitted upon any or no ground except the will of the husband. But polygamy and facility of divorce had a legal existence under the Mosaic law, and indeed are still practised among those Jews who live in countries where they are free to follow their own social Rabbinical laws. Yet among both Moslems and Jews polygamy and divorce were (and are) hedged about with regulations which render them not so easy and desirable as might seem.

I have known many Mohammedans who treated their wives with tenderness and respect, and were much influenced by them in domestic and even public affairs; the tenderness and respect shown being infinitely greater than is often received by wives in a certain class of society in our own country.

In approaching Moslems with a view to influencing them in favour of Christianity the wise advice of Sale should ever be in our thoughts: "not to give them ill words, and to avoid all reproachful language, which never did good either from pulpit or press."

ORDINARY GENERAL MEETING.*

GENERAL J. G. HALLIDAY IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed.

The following elections were announced :—

ASSOCIATES :—Rt. Rev. Bishop Mitchinson, D.D., F.G.S. ; Brigade-Surgeon Robert Gray, M.D. ; Richard E. W. Goodridge, Esq., M. Hist. Soc. Manitoba.

The following paper, by Rev. H. D. Griswold, M.A., Ph.D., entitled "The Arya Samaj," was then read by the Secretary, in the absence of the Author :—

THE ARYA SAMAJ. By Rev. H. D. GRISWOLD, M.A., Ph.D., Missionary, Lahore, India.

I. *Introduction.*

THE Arya Samaj is a Theistic and reforming sect of Modern India. It is the child of Hinduism; but, unlike the mother, it aims at a universal propaganda. Hinduism, of course, is willing to absorb all the tribes of the earth and enrol them as separate castes, but the Arya Samaj is willing to accept and purify the *individual* and receive him into the Arya brotherhood, be he Mohammedan or Christian.† In this respect the attitude of the Arya Samaj is modern and cosmopolitan. The Arya Samaj has just been called "the child of Hinduism." It would be more correct to call it the joint offspring of Hinduism and Western thought, scientific, religious and philanthropic. The word "Samaj" means society or assembly, and "Arya" is an ancient Indian epithet meaning "noble," a name applied to members of the three

* Monday, January 19th, 1903.

† At the last anniversary of the Vegetarian Section of the Arya Samaj, held in Lahore, November 30th–December 1st, 1902, several Christians were purified and received into the Arya Samaj.

"twice born" castes. The founder of the Arya Samaj thus sought to glorify his society and make it attractive by bestowing on it a name of conspicuous dignity, and one, too, clothed with patriotic associations.

II. *The Founder*.

The Arya Samaj was founded by Swami Dayanand Sarasvati, a Gujrati Brahman, who was born in the year 1824, in Kâthiâwâr. He refused to give either his name or his birthplace during his life, lest he should be hindered in his work. After his death in 1883 it came out that his real name was Mul Shankar, son of Amba Shankar, a banker and revenue collector living in a village under the jurisdiction of the Raja of Morvi in Kâthiâwâr. He was brought up in the Shaiva type of doctrine. For his home life and for the account of his early wanderings and studies, we are indebted to his Autobiography first published in the *Theosophist* (October and December, 1879, and November, 1880), and the only important fruit of the temporary union of the Arya Samaj and the Theosophical Society. There are three moments of religious interest in the home life of Mul Shankar, *alias* Dayanand Sarasvati—first, his revolt from idolatry owing to an experience on the night of his initiation into the mysteries of the Shaiva cult, when he saw mice running over the image of Shiva and defiling it; second, his determination to abandon the world and seek Mukti (salvation), the result of his profound grief on account of the death of his sister; and third, his flight from home at the age of twenty-one, in order to avoid the entanglement of marriage into which his parents were determined he should enter. There is no reason for questioning the essential truthfulness of the account of these early experiences. The sincerity of his revolt from idolatry, however it came about, is proved by the magnificent courage and vigour with which he afterwards attacked idolatry in its chief centres, such as Hardwar and Benares. In fact, in his attitude towards idolatry he was an ally of Christianity rather than a foe. After his flight from home he spent about eighteen years as a Sannyâsi or religious mendicant, wandering from place to place and learning from a great variety of teachers. He first came under Vedantic influences, and for a time was convinced of the identity of the individual soul and the Supreme Soul. Afterwards he became interested in the science of Yoga and deserted the Vedanta standpoint. Later on he studied the Vedas under

the tuition of the blind Swami Virajananda of Mathura. His religious development may be described as a movement from Pauranic Hinduism through Philosophical Hinduism to Vedic Hinduism. He successively deserted Shaivism and Vedantism, but clung to the last to the *Sankhya-Yoga* as the philosophical point of view from which, in his opinion, the Vedas ought to be interpreted.

The last twenty years of his life may be called the period of his public ministry (1863–1883). His history during this period is a history of preaching tours throughout the length and breadth of India, from Bombay and Poona on the south to Calcutta and Lahore on the north, of public discussions with pandits, maulvies and missionaries, and of literary work. In the great centres of idolatry his usual theme was, "Is there idolatry in the Vedas?" He founded the Arya Samaj in Bombay, in the year 1875, and visited the Panjab in 1877. He died in 1883, in the city of Ajmere, Rajputana, under circumstances which gave rise at the time to the suspicion that he had been poisoned. But of this there is no clear proof.

Some account may here be given of the personality and character of the founder of the Arya Samaj. The earliest contemporary sketch known to me of the appearance of Swami Dayanand was drawn by Rev. T. J. Scott, D.D., at the *Kurkora Mela*, on the banks of the Ganges, October 29th, 1868. It was when the Swami had gone into partial "retreat" for "further contemplation and perfection of character," as one of his biographers tells us.*

The description reads as follows:—"In the afternoon I visited a fakeer down on the sand by the water's edge, of whose learning and sanctity I had heard in the crowds of the bazaar. I found him sitting in a little straw booth; and a splendid-looking fellow he was, with his herculean frame and massive limbs, fine oval cranium and really benignant face. He was sitting almost entirely naked, and entered at once into pleasant conversation. I found him to belong to a class of mendicants, who profess to have entirely abandoned the world, and are living in complete contemplation of the Deity. The conversation revealed in him a fine mind and well versed in the ancient lore of the Hindus. He talked only Sanskrit, and our conversation was conducted through an interpreter."†

* *Dayananda Saraswati*, by Arjan Singh, p. 23.
† *Missionary Life among the Villages in India*, p. 162.

Swami Dayanand from all accounts was a man of splendid physique, impressive personality and great strength of will. In a word, he was a born leader of men. His manner was commanding and imperious, but he could also be gracious and suave on occasion. In debate his style is described as of the "sledge-hammer" sort. The epithet *mahámurkh* (great fool), was often applied by him to the defenders of other faiths. In his criticism of other faiths, he was exceedingly unsympathetic, not to say unfair. There is a general impression that this characteristic of the master has descended to his followers—in other words, that the members of the Arya Samaj are not remarkable for courtesy and fairness in religious discussion. Happily, however, there has been some improvement in this matter. As regards moral character, the Swami in his autobiography is very frank and open in telling the world how he dissembled to his father after his first flight from home, and how he was accustomed to the use of *bhang*, an intoxicant, during his ascetic life. I do not mention these things by way of reproach. It is far healthier and more ethical to confess these things, than, like some other teachers in India, to claim virtual sinlessness.*

At the same time, it must be admitted, I think, that Swami Dayanand's naïve way of referring to the duplicity which he showed to his father argues a defective sense of the "ugliness of falsehood."† The actual account of his meeting with his father after his first flight from home is as follows:—"No sooner had I met his glance, though then knowing well that there would be no use in trying to resist him, I suddenly made up my mind how to act. Falling at his feet with joined hands and supplicating tones, I entreated him to appease his anger; I had left home through bad advice, I said; I felt miserable, and was just on the point of returning home when he had providentially arrived; and now I was willing to follow him home again" (Autobiography). Swami Dayanand has been charged with pursuing a path of *expediency*, that is, of holding the Jesuitical theory that a good end justifies questionable means. The episode referred to above tends to support this charge.

* For example, Mirza Ghulam Ahmad of Qadian, who claims to be the "Promised Messiah."

† *Cf.* J. C. Oman, *Indian Life, Religious and Social*, p. 106.

III. *Doctrine.*

We come now to the doctrine taught by Swami Dayanand. It has already been stated that the Arya Samaj is the joint offspring of Hinduism and Western thought. As Swami Dayanand wandered up and down throughout India, he studied not only the past but also the present, not only the thought of India as embodied in Veda and Upanishad, Sutra and Epic, but also the thought of Europe as embodied especially in the devices of modern science, everywhere manifest in India, such as railroads, telegraphs and other mechanical inventions. He finally arrived at a scheme for reconciling the present with the past, the West with the East. It was something like this. The word "*Veda*" means *knowledge.* It is God's knowledge, and, therefore, pure and perfect. This transcendent and heavenly knowledge embraces the fundamental principles of all the sciences. These principles God revealed in two ways: (1) in the form of the four Vedas, which were taught to four rishis, Agni, Vâyu, Sûraj and Angira, at the beginning of Creation over one hundred billion years ago, and (2) in the form of the world of nature, which was created according to the principles laid down in the Vedas, somewhat as the Tabernacle is said to have been built according to the pattern shown in the mount (Exodus xxv, 40).

Notice the ambiguity in the meaning assigned to the word "*Veda.*" It is (1) God's knowledge, the content of the Divine omniscience, which is *one thing*; and (2) it is the collection of Aryan literature known as the Four Vedas, which is *quite a different thing.* One may believe in the Veda in the first sense, without accepting it in the second sense. The Vedas, then, being regarded as "the Scripture of true knowledge," the perfect counterpart of God's knowledge so far as "basic principles" are concerned, and the "pattern" according to which Creation proceeded, it follows that the fundamental principle of Vedic exegesis will be the interpretation of the Vedas in such a way as to find in them the results of natural science. As E. D. Maclagan remarks: "The bases of the Aryan faith are the revelation of God in the Vedas and the revelation of God in nature, and the first practical element in this belief is the interpretation of the Vedas in conformity with the proved results of Natural Science."* In other words, there is involved the assumption that the Vedas as "the

* *Census of India*, 1891, vol. xix, p. 175.

scripture of true knowledge" must contain "the basic principles of all sciences," and accordingly that every scientific discovery and invention of modern times must be taught, germinally at least, in the Vedas. The science of the West, then, is but the realization of the scientific programme intuited by the seers of the East, over 100,000,000,000 years ago. To the ancient East belonged the faculty of seeing; to the modern West belongs the faculty of doing. The programme comes from the East; the realization from the West. Thus the West in realizing the principles laid down in the Vedas is following unconsciously the Vedic religion. A pamphlet has just come to hand, issued by the Arya Samaj, and bearing the title, *The Source of the Christian Religion is Buddhism.* Its fundamental thesis is that all religions have their source in the Vedas, and that diversities in religion are due to the influence of different environments upon the primitive Vedic revelation.*

The principle that all the sciences have their revealed source in the Vedas is here enlarged by the further principle that all religions find their original and inspired source in the same early literature. In this way Swami Dayanand sought to render to the East the things which belong to the East, and to the West the things which belong to the West. It may readily be imagined what kind of interpretation is involved in the attempt to find in the Vedas the results of modern scientific invention such as steam engines and gunpowder, the electric telegraph and X-rays, cannon and ocean steamers. It is a highly subjective and fanciful interpretation, not recognized as legitimate by a single Sanskrit scholar, either Indian or European, outside of the Arya Samaj. It is an interpretation which disregards at will the grammatical distinctions of mood and tense, number and person, active and passive. In a word, it is interpretation in the interests of a theory, the theory, namely, that the Vedas teach a pure monotheism and contain "the basic principles of all the sciences." It is as if one should attempt to find a pure monotheism and a complete programme of scientific inventions in Homer's *Iliad* or Virgil's *Æneid.* Every historical allusion in the Vedas is carefully explained away on the ground that "the Vedas being Divine revelation, expound the laws of existence in its various

* Compare the doctrine of "primitive revelation" held by some Christians.

departments, which precludes the mention of persons and places."*

Thus the method of interpretation is dogmatic and *a priori*, rather than historical. Indeed, there can be no more vivid commentary on the lack of the historic sense among the Hindus than the fact that the membership of the Arya Samaj embraces a large number of English-educated Indians, many of whom are college-bred, and yet they accept as historical the date 100,960,853,000 years ago as the date of the giving of the Vedas, and regard as scientific that interpretation of the Vedas according to which they constitute a prophetic programme of all the scientific inventions of modern times. One remedy for this state of affairs must surely be along the line of the encouragement in the Indian universities of genuine historical study, *i.e.*, the mastery of the methods and canons of historical research, instead of the passive memorizing of untested statements. Enough has been said to show that the doctrines of the founder of the Arya Samaj are based not on the Vedas themselves, but upon an *uncritical* and *unscientific* interpretation thereof.

So much for the Arya doctrine of the Vedas, and of their interpretation. As in every religion, so in the Arya Samaj, the "doctrine of Holy Scripture" is of fundamental import. But while Swami Dayanand's doctrine of the Vedas is exceedingly open to criticism, it is only fair to say at the same time that he has shown a sound instinct in excluding the later literature of India, *e.g.*, the Puranas and Tantras, from the canon of Sacred Scripture. If any portion of Indian literature deserves to be called sacred *par excellence*, it is the Upanishads and certain hymns found in the *Rig Veda*, notably those addressed to Varuna.

The theology of the Arya Samaj is the religious philosophy of the *Sankhya-Yoga* read into the Vedas and Upanishads. The fundamental principle of the Sankhya is the dualism of *Prakriti* and *Purusha*, matter and soul. The Yoga, or theistic Sankhya, takes one of the innumerable souls recognized by the non-theistic Sankhya and makes it the Supreme Soul. The result is a kind of trinity consisting of God, Soul (or souls) and Matter, each independent and self-existent. God is eternal, so also is each soul, so also is matter. Pandit Ralla Ram, the theologian of the Vegetarian section of the Arya Samaj, refers to this as "the universal trinity recognized by science and

* *The Arya Patrika*, October 19th, 1901.

religion alike" and as "the most important of the doctrines of the Arya Samaj."*

This doctrine of three separate, eternal, and self-existent entities is of course open to grave objections from the standpoint of philosophy. If God is eternally confronted by souls and matter, of which He is not creator, and for which He is in no way responsible, the absoluteness of His sovereignty must necessarily be very seriously impaired. God becomes logically, on this theory, little more than an umpire to preside over the inexorable processes of Transmigration, and Karma a personified moral order, the apotheosis of the principle of retribution. Karma, or the law of moral causality, was the God of Buddha. This law personified is the God of Swami Dayanand. While making these criticisms, one may cheerfully admit that the realism of the Arya theology has a relative justification as a protest and reaction against the extreme idealism of the Vedanta philosophy, with its exoteric doctrines of emanation and absorption and its esoteric doctrines of illusion and identity. There is also an attempt to do justice to the claims of both science and religion. As regards the freedom of the will, the Arya Samaj holds that "we are not free to will an act, if we were created by some one else. . . . In order to be free we must be believed to be eternally acting as we thought best, or as our previous *karmas* determined the course for us, receiving, according to God's eternal laws, the fruits of our own good or bad deeds, and shaping in accordance therewith, and with our own hands, as it were, our future destiny."†

Thus, as regards the soteriology of the Arya Samaj, the great means of salvation is the effort of the individual, and for this a sufficient sphere is allowed through the doctrine of transmigration, or repeated births. Salvation is conceived as virtually an eternal process. At the last anniversary meeting of the "College" section of the Arya Samaj, held in Lahore, November 30th, 1902, the one sentiment in the address of one speaker which was vigorously applauded was the speaker's conviction that at some time or other, sooner or later, perhaps in some cases after an unspeakable lapse of time, every soul will come to that knowledge of God which constitutes beatitude. In this way, the Arya Samaj is the advocate of the "larger hope."

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* "Bearing of Religion and Morality on Final Causes." *The Arya Patrika*, Lahore, December 14th, 1901.

† *The Arya Patrika*, *loc. cit.*

Ethically, there is one doctrine taught by Swami Dayanand, and accepted by the Arya Samaj, which is most objectionable. This is the doctrine of *Niyoga*, which may be described as a virtual recognition of the principle of free love, sanctified by a temporary arrangement. At the very best it can only be characterized as temporary marriage.

IV. *The Order.*

Under this head will be given some information concerning the history, organization, government, worship, methods of work and statistics of the Arya Samaj. The history during the last decade is a history of *disunion*, the Arya Samaj having split up into two sections. The ostensible grounds of the split are two-fold: (1) differences of practice with reference to the use of flesh for food, and (2) differences in theory concerning the proper policy to be pursued in higher education. From the point of view of the first difference the two sections are called respectively the "meat-eating" party and the "vegetarian" party; and from the point of view of the second, the "college" party and the *Mahâtmâ*, or old-fashioned party. Both differences run back into a still more fundamental difference of opinion, namely, concerning the degree of inspiration and authority to be assigned to the teachings of Swami Dayanand. In this matter, the position of the College party, as the party of light and culture, is liberal, while the attitude of the *Mahâtmâ* party is conservative. The educational work of each section is carried on in harmony with its special theory. The "Cultured" party has a college at Lahore, the *Dayanand Anglo-Vedic College*, which it administers on modern lines and with a considerable degree of efficiency. The *Mahâtmâ* party, on the other hand, has an institution at Hardwar known as the *Gurukula*, in which ancient ideals of education receive the emphasis. The past decade has also been fruitful in biographies of the founder of the Arya Samaj, no less than four having been written within this period, and one of them a very voluminous work.

The organization of the Arya Samaj embraces the local samaj or congregation, the provincial assembly, and (under contemplation) a national assembly for all India. The conditions of membership in a local samaj are (1) implicit faith in the Arya "Decalogue" or Ten Principles, and (2) belief in the canons of Vedic interpretation laid down by Swami Dayanand. The candidate for membership must have reached the age of

eighteen. There is no special ceremony of initiation for members of the "twice-born" castes, but outsiders such as Christians and Mohammedans must undergo a ceremony of purification. The members of a local samaj are of two kinds, probationers or non-voting and approved or voting members. The period of probation is one year. The officers of a local Samaj consist of a president, vice-president, secretary, treasurer and librarian, elected by the voting members. It will be observed that the officers are those of an ordinary secular association. The Provincial assembly is a representative body composed of delegates appointed by the local congregations. Each affiliated samaj has the right to send one delegate for every twenty members. Delegates are elected for three years, and there is an annual meeting of the Provincial assembly, which has the oversight of all the congregations situated within a particular province, *e.g.*, the united Provinces or the Punjab. Thus the form of government of the Arya Samaj is clearly representative. It is not quite clear, however, whether its special type is Congregational or Presbyterian; in other words, whether the Provincial assembly is the analogue of a Presbyterian Synod or of a Congregational Union.

The weekly religious service of the Arya Samaj is held on Sunday morning, since the Government offices are closed on that day. As it is the only religious service of the week, it is a long one, lasting three or four hours. Religious worship consists of the burning of incense (the *Homa* sacrifice), accompanied by the chanting of Vedic mantras, exposition of the writings of Swami Dayanand, prayer, hymns, sermon and lecture. With the exception of the use of incense, the constituents of worship are those of an ordinary Protestant service. Thus the worship is non-ritualistic and Puritan in its simplicity. Long sermons are apparently enjoyed.

In its methods of work the Arya Samaj follows the methods current among the various missionary societies working in India. It uses preaching, education, tract distribution, newspapers, etc., etc. Its methods of raising money are as follows: (1) Voting members must pay $\frac{1}{100}$ of their monthly income. (2) Special appeals are made at the anniversary meetings. Much is made of such meetings as occasions for stirring up zeal and creating a spirit of self-sacrifice. At the last anniversary of the "cultured" section of the Arya Samaj held in Lahore at the end of November, 1902, there were "two remarkable incidents. The one was the surrender of a life policy for Rs. 10,000 to the samaj by one gentleman in the heat of the enthusiasm created

by the appeal for subscriptions that was made, and which brought forth donations to the amount of about Rs. 10,000 besides this one offer. But the other was a much more remarkable incident, viz., the resolution declared by Lala Mehr Chand, B.A., to devote himself to the interests of the D.A.V. College and to work on bare subsistence, taking a vow of poverty. . . . A notable start in this direction was made by the example set by Lala Hans Raj, B.A., Principal D.A.V. College."—*Panjab Observer.*

There are two classes of preachers, honorary and paid. The honorary preachers are local, the paid are itinerant. The first class consists of men in regular employment as clerks, pleaders, teachers, physicians and other business men, mostly English-educated and many of them college-bred. On the other hand, the paid preachers give all their time to the work of preaching, and are, as a rule, educated only in the vernacular. The salary of a paid preacher ranges from Rs. 12 to Rs. 60. It is interesting to note that the "cultured" party emphasizes *education*, while the *mahâtmâ* party emphasizes *preaching.* Each section of the Arya Samaj maintains a number of high schools and orphanages, and also several newspapers both in English and in the vernacular.

We come finally to the statistics and future prospects of the Arya Samaj. According to the census of 1891, there were in India ten years ago 39,952 Aryas, including men, women and children, the United Provinces returning 22,053 and the Panjab 16,275. For 1901 the census for the United Provinces returned 65,282 Aryas, an increase of 43,229 during the decade. This is a remarkable advance. The numerical increase has not been so great in the Panjab, the census for 1901 returning 9,105 males over fifteen, not counting women and children. Thus the numbers of the followers of Swami Dayanand, including men, women and children, must at present amount for all India to 80,000 or 90,000. Such is the result of the first quarter of a century of work on the part of the Arya Samaj. Such is the monument which Swami Dayanand has secured for himself through his disciples.

As regards the future of the Arya Samaj it is difficult to play the prophet. It is undoubtedly the most popular theistic and reforming movement in India to-day. In the matter of female education, emancipation of women, temperance and other reforms, it is in the line of progress. It also ministers to the patriotic spirit through its insistence that the Vedas are the original source of all the religion and

science of the world. It accordingly appeals strongly to "Young India" as the party of patriotism and progress. It contains many earnest and good men who sincerely desire the welfare of their country. It keeps in close touch with orthodox Hinduism through the fact that comparatively few members of the Arya Samaj have broken caste. Will it ultimately be reabsorbed into the abyss of Hinduism or will it advance to a more rational and enlightened position? The future alone can answer these questions.

V. *Select Literature on the Arya Samaj.*

Veda Bhâshya. (Commentary on the Vedas.)

Veda Bhâshya Bhûmikâ. (Introduction to the above Commentary on the Vedas.)

Satyârtha Prakâsha. (Exposition of the Vedic religion and refutation of all the modern faiths.) The three above-mentioned works (in Hindi) are all from the pen of Swami Dayanand Sarasvati, and constitute the authoritative literature of the Arya Samaj.

Dayananda Sarasvati, pp. 167–182 of Professor Max Mueller's "Biographical Essays," vol. ii, Reissue, 1898.

The Arya Samaj and its Founder, chap. iv of "Indian Life, Religious and Social." By J. C. Oman, London, 1889.

The Brahmo Samaj and the Arya Samaj. By F. Lillingston, London, 1901.

The Arya Samaj: an Outline Study. By Wilbert W. White.

The Arya Samaj, its Teaching and an estimate of it. By Rev. Henry Forman, Allahabad, 1889.

The Principles and Teaching of the Arya Samaj. Six lectures by Pandit Kharak Singh and Dr. Martyn Clark, 2nd edition, Lahore, 1887.

Exposure of Dayanand Sarasvati's Deliberate Falsification of the Rig Veda. By Rev. T. Williams, Rewari, 1893.

The Dayanandi Interpretation of the word "Deva" in the Rig Veda. By H. D. Griswold, Lodiana, 1897.

Pandit Dayanand Unveiled. By Pandit S. N. Agnihotri of the Deva Dharma.

The Niyoga Doctrine of the Arya Samaj. By Ruchi Ram Sahni, M.A., Lahore, 1897.

The Problem of the Arya Samaj. By H. D. Griswold in the *Indian Evangelical Review*, January, 1902.

The Arya Samaj: its History, Progress, and Methods. By Rev. B. A. Nag, in the *Indian Evangelical Review*, October, 1901.

DISCUSSION.

The CHAIRMAN.—We have had an interesting paper; but, unfortunately, the writer of it not being present, it a little takes off from the point of the discussion that may follow. However, although he is not here, I suppose we can thank him for it and the Secretary for reading it and Mr. Rouse, who assisted him.

In the meantime should there be any remarks to be made on the paper by any present we shall be glad to hear them.

The SECRETARY.—I am sure we are all indebted to the Rev. Mr. Griswold for drawing up this paper for us. He has had great opportunities of noticing the rise and advance of this newest sect in India, and after the account he has given us of its rise and advance, I think we may, on the whole, feel thankful for the Arya Samaj and for the good it is doing in helping to enlighten the Hindu population, chiefly in bringing them more under the influence of western ideas for the emancipation of the women and the spread of culture. Of course we should all have rejoiced if this movement had really been more towards Christianity; but it is evidently a step in that direction. Mr. Griswold, very properly, does not venture to take the *rôle* of a prophet; still I think we may go so far as to say that it appears to contain the seeds of dissolution within itself.

You will see that this movement depends on two factors—it resolves itself into two divisions. The view that the Vedas date back a billion years is a statement that the educated classes in India will ultimately realize to be absolutely absurd; and then the attempt to show that the great advance in art and science of the nineteenth and twentieth centuries have had their "basic" foundation in the Vedas will also, in time, appear to the educated classes to be absolutely without foundation in fact. They will see that the Vedas, however admirable they are in some respects, moral and social, yet the demand upon the view of the cultivated classes that they contain the seeds and basis of all modern invention is that which cannot hold water for a moment and must, ultimately, be disproved.

These reasons, and others also that I might add, such as that the movement itself, within a quarter of a century, has been split up into two divisions, not absolutely opposed, but divergent sub-

sects, seem to show that this movement, however popular it may be at the present day among the classes who are not prepared to accept Christianity as placed before them by the missionaries of India, has been adopted by them as a sort of half-way house which they think will bring them into a sort of concord with the progress of western civilization, and yet enable them to retain a good deal of the faith of their fathers.

This seems to me to be the lesson which the paper places before us.

General ROBINSON.—Perhaps I might say a few words on this subject, having lived in India.

I am afraid what the Secretary has just said is not what we should wish. I am afraid there is a great tendency in reforming Hindus to avoid Christianity. The Brahm Samaj was a good thing which brought India much nearer to Christianity; but Arya Samaj is an attempt to bring Hinduism into line with modern science. Its adherents are very bitter against Christians and Christianity, and it is a great trouble to our missionaries in India.

The Indian has learnt to despise his own religion, Brahmanism, and he sees that it is not a scientific religion. He wants, therefore, to make his religion a scientific religion. We see by this lecture how miserably he has failed, and we must trust that the result of this attempt will not in the end be a lasting one. Fortunately he is so very unscientific in his proposals that he will be left out by the modern Hindu who gains his teaching at Cambridge and Oxford and knows better. Therefore I trust something better will arise in India than the Arya Samaj. (Hear, hear.)

Professor ORCHARD.—I am afraid I should be disposed to say that this faith shows no advance whatever in a religious or philosophical point of view at least.

Dr. Griswold has brought before us a very remarkable man—a man whose mind was ethical rather than religious and practical rather than philosophical. This sage was undoubtedly a man of great natural shrewdness, sagacity, acuteness, and natural foresight. He no doubt thought when he brought western ideas into enlistment in his protest against idolatry, that by the simplicity of the worship he enjoined on his fellows, he was doing service to his country; but this sect that he founded—this Arya Samaj—will, I think, not be remembered on the ground of any philosophical or

religious excellence. It is, no doubt, an interesting historical experiment to see how far you can introduce western civilization without introducing western religion.

I cannot regard Mul Shankar as, in the highest sense, a great reformer. His idea that "the bases of the Aryan faith are the revelation of God in the Vedas and the revelation of God in nature, and the first practical element in this belief is the interpretation of the Vedas in conformity with the proved results of natural science," is not, I think, so very absurd from his particular point of view. He regarded the Vedas as the divine revelation. If they had been the divine revelation it is quite evident that the proved results of science must agree with that divine revelation; but where his argument fails is in his enormous assumption that the Vedas are the divine revelation—that they are the Word of God, and when he searched these Vedas and found, as one would think he must have found, that they were not in accord with science, it is, perhaps, surprising that he did not begin to doubt whether these Vedas might not be rather the reverse of knowledge.

With regard to the visionary character of his doctrine, I read, "As regards the freedom of the will, the Arya Samaj holds that we are not free to will an act if we were created by some one else. . . . In order to be free we must be believed to be eternally acting as we thought best." So he holds that man was not created if he has free will. If he has been created, argues Mul Shankar, he cannot be free in his will; but that he is free in his will and, therefore, eternal—that there was no time when he did not exist. Having affirmed that he is free, that is contradictory.

As to whether the system will survive long, I apprehend that is much a question whether in fact the missionary effort in spreading the religion of Jesus Christ the Lord does, or does not, keep pace with more secular civilization.

Mr. MARTIN ROUSE.—I should like to ask General Robinson what has become of the Brahm Samaj. When I was a boy I heard something of it, and I heard of a certain Chunder Sund being received here in a very friendly way by Dean Stanley. He appeared to be a kind of Unitarian who had given up idolatry in his worship, and the Dean hoped he would be led on into Christianity. Whether it has faded away I do not know, but I have not heard of it since.

General ROBINSON.—It is a long time since I was in India; but I am afraid that the Brahm Samaj is not advancing. I do not know that I ought to say "afraid," for it has missed its mark. Round Calcutta and the lower part of Bengal is where you find the Brahm Samaj. As the last speaker said, it seemed to approach the truth, and it very nearly did so, and it got all its teaching from Jesus Christ. It accepts our Saviour as the Great Teacher, and it seemed very nearly as if its leader was going to accept Jesus Christ altogether as the Son of God; but just at last he failed. It takes the moral code of the New Testament as its code of morals, and it is hoped that through the teaching of our missionaries some of the Brahm Samaj may be led to accept Christianity, but at present, as I say, it has just missed its mark. So it has not advanced. I do not think it is dying out altogether, but it hangs about the neighbourhood of Calcutta and Bengal.

The CHAIRMAN.—I am afraid my knowledge of India has led me first to this conclusion—that the Brahm Samaj, the Arya Samaj, and such-like doctrines, are all of them struggles against the advance of light and truth. I do not believe there is much vitality in any of them as far as I have been able to see; but it is a curious thing how the human mind will attach itself to what pleases it and will bring itself to believe it. What they make up their minds to believe (and let us take care that it is not the same, in some little measure with ourselves) they adhere to somehow. I think the root and offspring of them all has been the advance of western science and western religion, and a struggle against that advance. "Let us stop it and invent something else. We will take the emancipation of women, in theory at all events, but not much in practice. These westerns come and press these ideas on us; but we will hold tight to Hinduism somehow," and they thus struggle against the light and knowledge of the voice of God and His Christ. As far as they can they will struggle against all advance of western knowledge and light, which is a great misfortune.

The Meeting then adjourned.

ORDINARY GENERAL MEETING.*

DAVID HOWARD, ESQ., IN THE CHAIR.

DEATH OF THE PRESIDENT, SIR GEORGE GABRIEL STOKES, BART.

The CHAIRMAN.—I am sure all of you who have read your newspapers this morning will join with me in the profound regret with which we have heard of the death of our revered President. (Hear, hear.) He was one of those who might, if any man might, have been proud of himself. A man of the profoundest intellect and widest knowledge, he was yet one of the humblest men that ever lived.

I cannot help thinking that those who, even from a distance, have watched his life, may learn a lesson of the true proportion of things. He was profoundly humble, because all his great intellect was brought to bear upon deep studies, made in the face of, and in the consciousness of, deeper and profounder realities—the realities of eternity. Great as he was in science, his Christian faith was even greater than his human knowledge. He was one who has served God in his day and generation, and he has now fallen asleep—or rather he has awakened to the realities of the beatific vision which is the true knowledge which even his great intellect could only grasp or discern as in a "glass darkly"—the eternal verities! It has been our privilege to know him. God grant that we may follow in his steps.

I will now ask the Secretary to read the Resolution of condolence.

The SECRETARY.—

> "It is with the greatest regret that the Council have heard this morning of the death of their revered President,

* Monday, February 2nd, 1903.

SIR GEORGE GABRIEL STOKES, BART., Master of Pembroke College, Cambridge, and formerly President of the Royal Society. That such an eminent man should have held the office of President is a high honour to the Victoria Institute, and affords to the world a standing testimony that, in the view of one of the most distinguished representatives of scientific progress, the relations between science and religion are entirely harmonious.

"The Members of the Institute desire to record the deep sense of gratitude and reverence with which the name of Sir George G. Stokes will be cherished amongst them. To the last year of his life, and notwithstanding his increasing infirmities, he attended the meetings of the Council whenever he was able, and his advice was constantly at their service. Alike by the lustre he lent to the Chair, by his contributions to its proceedings, and by his constant support, he rendered incalculable service to the Victoria Institute.

"To this expression of their gratitude the Members of the Institute desire to add the offer of their respectful sympathy to the members of Sir George Stokes's family.

"EDWARD HULL, LL.D.,
"*Secretary.*"

The CHAIRMAN.—I think I need hardly put that resolution to the meeting; but at the same time I would ask you to express your confirmation of it in the usual way. [Carried unanimously.]

The SECRETARY.—It was not thought desirable, after due consideration, to postpone this meeting in consequence of the event to which your attention has just been called by the Chairman, because it would have been impossible to give notice either to the Members of the Council, or to the other Members in attendance here, that a postponement had taken place, in consequence of which you would all have been put to very great inconvenience, and, I venture to say, disappointment. I hope, therefore, you will approve of the course taken by the Council in holding our meeting, which, I believe, is the course that our late President would himself have approved.

The Minutes of the last Meeting were then read and confirmed.

The following paper was then read by the Author:—

ON THE UNSEEN LIFE OF OUR WORLD AND OF LIVING GROWTH. By Professor LIONEL S. BEALE, F.R.C.P., F.R.S., Government Medical Referee for England, Vice-President of the Victoria Institute.

IN the paper I am about to read, I shall venture to draw attention to some broad general questions of interest, which have an important bearing on recent doctrines lately very popular, in relation to our modern science, philosophy and religion, but considered and discussed from a scientific and rational point of view only.

There is in my judgment evidence of an absolute difference between *living matter and living growth*, and every kind *of matter that is not in the living state*, including the enormously preponderating amount of matter of our world, in very different states, and of diverse composition and the matter of the universe, that cannot under any conceivable circumstances, *live.* The distinction of all life, from all non-life, rests upon facts of ordinary general observation, as well as on minute investigation with the highest magnifying powers yet made.

I shall maintain, that there is no reliable evidence of any gradual transition from any condition of non-life, to any condition of life whatever—that all matter that *lives*, has unquestionably proceeded *from matter that lived before it*, and that to this truth, there has probably been no exception, since the time of the creation.

The facts and arguments which so far have been advanced, against religious truth, and belief in God and Infinite Power, in living nature, are in my opinion unreliable, even if considered from the side of science only. Man is man from the earliest period of his existence as a structureless germ; and there is no proof or evidence, that man has descended from, or is or was, in any way specially related to, any other organism in living nature, through evolution or any other process, and that in support of all such conjectures concerning man's origin, there is not at this time a shadow of scientific evidence.

For little more than fifty years, has it been possible for man to study the minute structure of living organisms, or to investigate the wonderful phenomena of life and growth and *vital* move-

ment, universal in living nature, and characteristic of all the living matter known in this world; but not of any other kind, state or condition of matter yet discovered, or to be made by any process known to science. For this short time only, have we possessed the required instruments, and other means of studying the great problems of life and living growth, such as very high magnifying powers with excellent definition, and more successful methods of minute research, than were at he command of our predecessors of the early part of the nineteenth century. Recently many new and important facts have been ascertained, and we have been able even to realize to some extent the changes which probably occur during living growth, and those which result in the formation of tissue-structure, by particles of living matter in man, animals and plants, and in some living organisms of extreme minuteness, all of which have been formed from and by living matter only.

I have already had the privilege of bringing before the members of the Victoria Institute several points of interest bearing on the general question of the nature of the unseen life, and when, and precisely where, lifeless matter becomes living, and have endeavoured to ascertain exactly what happens, when, from living matter, structures and substances are evolved, having wonderful properties and arranged in a manner not to be imitated, or produced artificially, or by means other than by life. *Transactions of the Victoria Institute*, vols. xxix; xxxi, p. 218; xxxii, p. 337; xxxiii, p. 52; and xxxiv, p. 216.

Last year I ventured to draw attention to a broad fact of general application to the whole life-world, to which I do not think there is one single exception—the fact of the presence of a large proportion of water in all classes of living organisms and at every period of life. This fact in my opinion is established not only in regard of everything and every particle that is actually alive, but is also true of everything that lived in the past, or that will live in future time, as long as life shall exist on this earth. The idea of life, in my mind, is invariably associated with water; water as it seems to me being the first necessity; life could not have existed before water. To consider therefore what sort of life may exist in the stars and suns and other infinitely distant heavenly bodies, and in cosmic vapour is surely needless. *Cadit questio.*

Multitudes of the most minute and wonderful of living things in living nature, the Protozoa, consist almost wholly of water. They increase and multiply at a great rate, and some will live even in distilled water, and when the water evaporates scarcely

a trace of solid matter remains. The germs of many of these living particles are so light that they are suspended in the air, and wafted long distances by the slightest current. Many such "low" forms of life, are however of complex structure, and their movements suggest a very elaborate arrangement of motor organs acting as perfectly as, and more quickly than, those of the higher animals which possess a complex nervous system, not a few of the movements of Protozoa being evidently under the control of the will. These minute organisms possess the power of choosing the direction in which they will travel, and have also the power of suddenly stopping at any moment. The air and the water seem to provide all that is required for their existence, growth, and increase in number. It seems not improbable that the living matter of these delicate organisms acts directly on their contractile tissues, as nerves act on the muscles of the higher animals, and that by this direct vital action their movements are effected.

The proportion of water in all rapidly growing living particles, and also in tissues and organisms generally, during early growth, is so large that it is difficult to believe that the water itself is only of mechanical service in development and formation, and not actually living. Water and air seem to be the only necessary constituents of some of the lowest organisms and living particles, and I think we may regard them as being universally present in everything that lives not excepting the Bacteria. Death occurs in every particle of living matter, if the proportion of water be reduced below a certain point, but long before the matter can be said to be *dry*. My belief is that in all living nature there is not one instance of perfectly dry matter of any kind being alive, and that water is universally present in every part of our life world.

Is it not probable that many of the lowest organisms in the beginning were created in water, perhaps from water and air which was dissolved in the water, that their successors were developed, grew, and multiplied in water, and without doubt lived and died in water? As to the *origin* of life, looking from the science side, nothing is at present really known. But can we ever forget what we learned in childhood that "the Spirit of God moved upon the face of the waters," or the command, "Let the waters bring forth abundantly the moving creature that hath life"; and is it not remarkable that the close relation between water and life, should have been affirmed ages before science or scientific research could have been thought of—"Water of Life"—"Living Water"?

Whenever and wherever the temperature is uniformly much below the freezing point of water, or much above its boiling point, it is certain that there can be no human life, or life of the higher warm-blooded animals; and, say, one or two hundred degrees below or above the points indicated, that there could certainly be no life of any kind whatever. The idea therefore that any kind or form of living thing, or living matter of which we have any knowledge or experience, could have found its way on a fragment detached from some remote member of the cosmos, which after having been whirled millions of millions of miles through space, at a velocity which would have destroyed life of any kind, and at last deposited here as the first living organism or particle—must I fear be regarded as a conjecture inadmissible under the conditions which probably ruled at the remote period of time suggested. This being so, is it unreasonable to ask whether it would not be wiser for us to postpone the further consideration of the nature and origin of species, and perhaps some other supposed evolutionary processes, and all discussion thereon, until we shall be able to claim a little more definite knowledge than we have, on the nature of the life and growth of some of the simplest living things around us, and perhaps also something more definite concerning the nature and origin of our own powers—vital, intellectual, moral and religious? And may we not hope that, as believers in science and truth, we may be permitted by physical authority to retain provisionally our belief in the creation of all life by the living God, and refrain from immediately accepting as true, purely physical doctrines of life, as well as the dictum that "the living and non-living are one," which cannot in any sense be true?

The remark that during the past century the tendency of scientific thought has been towards a purely physical explanation of all life and vital action, is no exaggeration. Thought, and the action of the human mind have been included in the physical category, and have been held to be *mechanical* in their nature. Such conclusions are, however, contrary to the obvious distinction that exists between matter which is alive and matter which does not live—a distinction admitted by most people who think, and in some instances to be demonstrated by microscopical observation. A few modern teachers of physical science suggest that life has arisen in non-living matter in obedience to unchanging resistless physical laws; and that life, like energy, material forces and properties, is in the domain of Physics, although no one has been able to point out a single particular in which any physical or chemical action resembles

the changes which occur in every vital act and in vital growth. Others prefer to consider the infinite power of life as immanent in all matter whether living or non-living. In the second century of the Christain Era, was it not argued that "either Providence or Atoms rule the Universe," but may we not now feel sure that atoms never did rule, and never will rule, anything in this world, and that ruling power in living nature has ever belonged, and will continue to belong, to Providence alone?

The wonderful advance in every department of natural knowledge and the unceasing improvements in the methods of investigation, including the preparation of all kinds of specimens for examination with high magnifying powers, during the Victorian age, have been unprecedented; and our new knowledge of the nature, genesis, movements, composition and physical state, not only of the matter of our world, but of the distant stellar systems, suns and their satellites, and the far off nebulæ, visible and invisible—has reached far beyond anything discovered in all previous time. The more exact knowledge of the operation of the unchangeable physical laws, by which the lifeless parts of the eternal universe have been, and must continue to be governed, are but a few of the great and remarkable additions to the knowledge of scientific men now living. No wonder then, that these, and the results of other very recent investigations in several departments of Physics, should have led many thoughtful persons to conclude that *all nature, living and non-living, belongs to one physical category, and that all worlds and all things in, or of them, are ruled by Physical law!* But the doctrine that all nature living and non-living belonged to one and the same physical category—that associated with the material Atom from the beginning, were promises and potencies of life—and that the *power* some of us called *life*, was evidence of the universal operation of unchanging physical law, and therefore subordinate to eternal matter and its forces and properties cannot be true. The enthusiasm of arbitrary law loving physicists has led them to see everywhere in nature the effects of universal energy only, and nothing indicative of vital power either in their own consciousness, or in the creation and maintenance of the life of the world. Geological research has however happily rescued us from the impending doom suggested by these supposed new physical revelations and such assurances as this:—Man is but a mechanism made and controlled, like the machines of which man is the maker, by physical law; and will and thought, and intellectual action, are but kinds or forms

or modes of matter and motion, "*sui generis* or *variously modified*"!

But does not the geological record prove that through infinite past time—farther, much farther back, than the imagination or reason, at this time with the aid of all human knowledge, can penetrate, countless living things grew and multiplied in air and water, and lived and died according to the general principles which prevail in the existing life-world of to-day, in which man occupies the highest position, and is and has been, playing the most conspicuous part, though but during a comparatively short period of the incalculable time that has elapsed since the beginning of life?

Is it not of surpassing interest to reflect that all this very ancient unseen life-power, the effects and mode of operation of which, have only so very recently been revealed to us, by the wonders of the structual results of vital growth, do not essentially differ even in minute particulars, from the effects of the life-power and the living growth of existing living forms, and that there is no evidence to lead us to suppose that the principles by which our whole living world is now governed, have not been in operation from the very beginning?

Although ancient life-forms have been supplanted by many generations of new organisms and new types, living and growing under very different external conditions, their derivation from, and origin in, structureless living matter, the development and formation of their tissues and organs, the general arrangement and action of their nerves and nerve-centres, the contraction of their muscles, the circulation of their blood and other fluids, and even the development, nutrition and action of their sense organs, were conducted in those early days according to the vital principles governing things now living. Indeed, vital action generally, seems to have been designed, created and carried out in primeval times and to have been governed and sustained by life power, like that which is in operation in the living organisms of to-day. In short, vital action characteristic of all life, simple and complex, past and present, seems to have continued without interruption or change in principle, from the very beginning, up to the present hour. Will any one from the science side, venture to suggest a limit to or change in, the design and power of Providence?

Facts of observation distinctly prove that life is, and has ever been, absolutely different and separate from all forces and properties of ordinary matter, and that the realm of life has ever been absolutely distinct from the realm of matter. Who shall

say that a time will come when death shall be universal, and that all life shall cease?

The idea of any relation having been established between non-living and living, by gradational advance from lifeless matter to the lowest forms of life, and so, onwards to the higher and more complex, is scarcely more than a vague surmise, and not the slightest evidence in its favour is supplied by the facts of any section of living nature, of which anything is known.

The life of the very lowest organisms that exist, or that have ever existed, is just as wonderful, and in all respects just as inexplicable by fact and reason, from a physical stand-point, as are life, mind, and soul of man himself; and it is as impossible now, as it would have been in ancient time, to account for vital actions of the lowest simplest organisms in living nature, although our present knowledge is by comparison infinitely great.

The lowest living particles *now* in existence cannot be regarded as in any sense higher or more advanced than the lowest simplest life of remote past ages, nor was the lowest simplest primeval life in any sense or degree nearer to the inorganic; and we can give no better account, say, of the vibration of the most ancient cilium of the lowest primeval protozoon, than of one of a mollusc of to-day, or of a cilium that belongs to a single living particle detached from the mucous membrane of the air passages of man.

Physical authorities do not appear to have considered what particular matter in various parts of a living organism, is the exact seat of those unseen vital actions characteristic of all that lives, or the real nature of the matter to which only the term *living* can be correctly applied; for, by far the greater part of any living plant or animal, *is not alive*, perhaps ceased to live months or years ago. The bulk of the bark and nearly all the wood of a living tree, for example, is as dead while the tree is growing, as it will be when the tree has been cut down. No living organism is alive in every part; and of many living forms, by far the greater part of each one has long ceased to live. Living matter, and matter that has ceased to live, indeed exist in every organ and tissue of man and animals at every period of life.

The tissue already formed does not *grow*, cannot *increase of itself*, like living matter, nor does tissue form new tissue; neither is tissue nourished, though permeated by constant slowly moving streams of fluid, circulating in its insterstices, which fluid contributes to its preservation in the normal state, and prevents

any degenerative changes. It is only the particles of *living matter* connected with tissue, and which were concerned in its formation, that cause the *interstitial circulation* referred to. In bone fluid flows towards, and from, the living matter in the lacuna, in those minute intercommunicating tubules, known as the "canaliculi," and in some other hard tissues the interchange of fluid is provided for in a very similar manner. But many tissues of man, animals and plants are, as already remarked, as dead and lifeless while still forming a part of the living body, as if they had been completely separated from it some time before.

By this unceasing interstitial circulation alone, is the health and activity of the living particles in all the tissues and organs of the body ensured. In man and the higher animals, it is quite as important as in the lower forms of life, which are not provided with self-acting circulating organs, by which the nutritive fluid is propelled into the immediate vicinity of the living particles, and then caused to flow towards them by the *vital action of each living particle*. By any change in this natural vital process, either in excess or deficiency, or in departure from the normal composition of the fluid, as occurs in many derangements of the blood as in fevers and inflammations, or by the introduction of poisons into the circulating fluid, the health of the part of the body may be deranged by the establishment of local or general diseases of various kinds, and perhaps the inception and growth of tubercle or cancer or some other abnormal vital phenomena may be thus accounted for. Only by taking daily a fair quantity of water can this important interstitial circulation be provided for, and the health of the tissues and living matter of the body insured.

By the "death" of the whole or a part of the body, is really meant the death of these innumerable particles of living matter or bioplasm, which in fact constitute the only part of tissue, organ, or "living body" that is really alive, and the only living matter which during life, lives or dies. Through these living particles of the body only, can it be said that we live and move and have our being. Vital power alone accounts for *growth*, between which process, and the lifeless aggregation as of particles of sand, or other non-living matter, there is no analogy. Deposition of matter layer after layer is *not growth*. The formation of crystals and their increase, is *not* an example of *growth*.

Between living growth—and the physical aggregation and deposition of lifeless particles of matter layer upon layer or the

gradual increase of a crystal by matter being deposited on its outer surface from its solution, there is no analogy. In *growth*, the matter which is to contribute to any increase must be dissolved, and the solution must pass into the very substance of the matter that lives, where only can life-power be imparted to the new matter, and certain of its constituent substances be caused to live. To this mode of the production of living matter in all living nature, there does not appear to be an exception. The necessity of absolute contact between living and non-living, seems to be essential for the communication of life to matter, and thus only, does life of any kind become temporarily immanent in matter. I regret to say that by some eminent teachers having great authority, children and students have been taught that living growth is comparable with the addition of non-living particles layer after layer to non-living matter. Crystals *grow*, says Herbert Spencer, but neither crystals nor any things that do not live, *grow*.

Increase, and *growth* are two very different processes, and the physical aggregation and deposition of non-living matter adduced as examples of *growth*, have nothing in common with that wonderful process, which occurs in the living world only. *See* Herbert Spencer, "The Principles of Biology." Revised and enlarged edition, vol. i, page 135, "*Growth*." But neither the author nor one of his followers, nor any fellow of the Royal Society seems inclined to consider with me, this important matter. This question of the nature of growth being closely related to that of t nature of life, involves the consideration of the great princip y which all life is distinguished from all non-life. Growth ady stated, occurs in the living matter only.

The action of r sense organs and of the motor phenomena of all nisms from the very lowest simplest living forms, up t an himself—Touch, taste, smell, sight, hearing and the action of other wonderful sense-organs in nature, as well as all active movements in a living body, depend upon the health and growth of its living matter. These and many other questions of the kind, were beyond the means of investigation of the wisest and most thoughtful of the men of past time, and have not yet been adequately explained by contemporary science.

During the last century, very ancient doctrines of life were revived and advocated with more zeal than discretion. Not long since, we were again assured that modern scientific investigation had confirmed the doctrines of Epicurus and

Lucretius, that we and all living things were but matter, "variously modified," by physical action "*sui generis*," and that all living things were machines, working for a limited time, and like the machinery made by man, doomed from the first to deteriorate and wear out, and at last to be cast away.

Though the structure of tissues and organs may appear complete, and on examination after death, nothing more than the *tissue* can be discovered by dissection and ordinary investigation, it must be borne in mind that no eye could see, or ear hear, no tongue could feel or taste, no structure in the brain could take part in thinking, understanding and speaking, unless the minute living particles of Bioplasm or living matter connected with the several tissues, were intact, alive and active—living particles, in the absence of which, no tissues could have been formed or could act, or be preserved in a healthy state.

Not one of the highly skilled confident advocates of physical doctrines of life, has yet succeeded in explaining according to Physics or Chemistry, the difference between one particle of matter which is alive, and the very same matter when life has ceased, nor has any chemist or physicist been able to tell us why a living particle once dead, has never been resuscitated or caused to live again by any physical or chemical treatment, or its life been restored from the "universal energy."

More than fifty years have passed, since, by repeated observations of the living matter of plants and animals, and the careful study with very high magnifying powers of the movements of the living matter of the Amœba, and especially that of very young Amœbæ, colourless blood corpuscles or leucocytes, living mucus and pus corpuscles of man, and some animals, and many other living growing particles in health and disease, was rendered certain that *vital movements* of living matter, were in their nature distinct from all movements of non-living matter. As already explained, the formation of all tissue-structures and organs in living nature, also depends on such particles of living matter or Bioplasm. The life-power being in its nature distinct from all material properties, forces or molecular phenomena, are inexplicable by any physical laws, or material properties yet discovered. In "Life Theories and Religious Thought," and many other works and memoirs published between 1860–80, I gave reasons for my belief in *Vital Power* in all living matter of our life world, from the lowest simplest living particle in nature, to that which is concerned in reasoning and in other mental processes by which

man is distinguished from all other living creatures. These and other observations connected with life and vital action were not in accord with the physical doctrines of life, then and indeed now very popular; but, as about the middle of the last century many scientific problems of profound importance were being settled by acclamation and the opinions of some who knew little of the facts, and could not discuss a purely scientific question such as the nature of life, from what they had seen, I could only publish my views, describe and illustrate by drawings what I had seen and shown to others, and give my reasons for entirely dissenting from the popular doctrines of contemporary evolutionists, monists, Rationalists, and Agnostics, here and abroad. Thousands of intelligent people have been persuaded to give up every religious idea, and to accept a number of vague general propositions, which are absolutely opposed to belief in Infinite Power, and living nature as being entirely and wholly due to the creative and sustaining power of the Almighty.

But is it not time that thoughtful and intelligent persons of all denominations and classes, had the general scientific facts of life and growth brought under their notice, so that they might judge whether these were really opposed to religious belief, as many have been led to suppose? My own conviction has long been that the more minutely living nature is studied, the more strongly will the reason be convinced of the evidence afforded by science alone, of the Infinite Power, Wisdom and Goodness of God.

In the last number but one of the *Journal of the Royal Microscopical Society*, October 1902, page 529, the reader will find an excellent photograph by Mr. F. E. Ives of the central part of one of the valves of *Pleurosigma Angulatum*, magnified upwards of two thousand diameters. This successful representation of the very minute and elaborate microscopic structure deserves very careful study, for it illustrates by its striking details a very remarkable arrangement, the mode of formation of which it is not at present possible to determine. Everyone familiar with the general microscopical characters of the large class of organisms to which the Pleurosigma belongs, will at least agree that the beautiful markings, which characterize the different species, cannot possibly be explained or reasonably accounted for by physical or chemical processes of any kind. The more carefully the well known organisms are examined and thought over, the more wonderful will the structure appear, and the more difficult to explain. If the student, skilful with

pen or pencil, and very patient, will accurately copy a small piece of such a specimen, I think he will be convinced that the orderly deposition of the siliceous matter can only be regarded as resulting from the influence of that invisible undemonstrable factor to which I have adverted under the name of "vitality." I claim this structure as one of many minute structures, the formation of which has never been explained, and must I think in reason be referred to the influence of life-power.

Among insects there is a beautiful little moth, *Botys hyalinalis*, which can be made to deposit its eggs on the thin glass slides used for microscopic investigation. The small eggs are somewhat flattened, and the thin membranous "shell" of very delicate structure, is as clear as the finest glass, and through which the changes of the germ can be well studied under a magnifying power of three hundred diameters, and watched from day to day, from hour to hour, without moving the slide, and at the ordinary temperature of the air, during the last week of July and the beginning of August. When, about three hundred hours shall have passed since the eggs were laid, the fully formed caterpillar may be seen to eat his way through the delicate shell, and immediately begin to search for food.

For the pleasure afforded me by this interesting investigation, I am indebted to Mr. Jeffry of Ashford, who, several years ago, kindly sent me many specimens of the ova deposited by the moth on thin glass slides. These could be kept under the microscope during the whole period of incubation, about three hundred hours, and examined without any cover glass or any special arrangement. It is curious that in two consecutive years, the moths began to lay on July 27th.

Mr. Jeffry published some notes of his observations in 1885 in the *Entomologists' Monthly Magazine*, vol. xxii, p. 126, and a more detailed account in vol. xxiii, p. 173. Dr. Osborne also published an article in *Science Gossip* in July 1885, but whether the phenomena of the development have been more recently fully worked out, as is probable, I am not aware.

In these ova, we can see with the help of the microscope, the changes which take place from day to day, and register them by photography.

To the thoughtful and attentive observer of living nature nothing can appeal more strongly, or increase his longing to know and to understand the vital changes which occur in everything that lives. He can see the very spots where the developmental phenomena proceed without interruption, organs appearing, muscles growing, and at length contracting under his

eye, the alimentary canal forming, the air tubes or *tracheæ* developing in many parts of the body, and its various segments, the legs, eyes and mandibles, and other structures of the caterpillar.

But *how*, and exactly by what means, all these orderly and prearranged phenomena are caused and carried out, remains to science so far, an insoluble mystery of living nature. One sees the changes, and can as it were follow them, and they can be accurately represented in photographs and drawings; but however closely we study and think about all that we have seen, we cannot get much beyond the knowledge of the fact of their appearing and continuing, while the germ is seen to grow from day to day.

We know there are particles of living matter associated with every particle of tissue as it makes its appearence. The several structures *appear*, but they would not appear unless their appearance had been preceded by living matter. This is a fact —a truth throughout living nature, from the earliest moment of existence to death, in the case of every organ and tissue, and I think was as true at the time of the first creation of life, as it is to-day. Structureless living matter is the only seat of action of that factor "life" or "vitality," between which and all energy, forces and physical agencies, the difference is *absolute*.

"Absolute":—By this word used several times in this paper, is meant a distinction so wide that, as far as I can ascertain, there is no relation whatever between the changes which occur in living and non-living—that the state of the matter, its properties and energies while it is alive, cannot be compared with the state of the same matter, either before it began to live, or when it shall have ceased to live—that there is no analogy between the states of life and non-life—no gradation from one condition to the other, and that the coming of matter into life, is as sudden as its death. The cessation of life in any given particle of living matter however minute, whether derived from the lowest simplest particle in living nature or from man himself, is also sudden.

All the *laws of matter* are compensated or suspended as long as matter is alive, but come again into operation, the instant the living matter ceases to live. This distinction between life and non-life all through our world, is therefore correctly described as *absolute*.

For the excellent photographs I have the pleasure of showing you, of the eggs of *Botys hyalinalis* from the day on which they were laid to the day of emergence of the fully formed caterpillar,

I am indebted to a friend of Mr. Jeffry's, Mr. Hammond of Canterbury.

Will anyone venture to regard this living organism which we see actually forming, or its organs of complex structure appearing in regular order and performing their several functions, as a lifeless machine, or as having been formed and caused to act by physical and chemical agency alone?

In these beautiful little insect eggs, each with the food supply for its minute germ during the whole period of development, the evolution of a free and independent organism with eyes, locomotor organs, having the power of selecting, seizing, masticating, and digesting its proper food—with the sense of sight and other senses; and which ere long will undergo another change, and after a short time will reach a very different and higher stage of existence.

The structure and arrangement of the minute scales which protect the wings and body of the moth are also worthy of study, but the examination of one single scale is enough to convince anyone who reasons on what he sees, of design, prevision, infinite power wisdom and goodness, in this life world. Is it possible to conceive, that each minute structural character could be produced by means, other than by the fiat of Almighty Power?

Few among modern writers and thinkers on the philosophic and scientific aspects of living nature, appear to have formed a definite idea of what is to be discovered by studying the living growing matter of a developing organism at a very early period of its embryonic life. Their ideas of *evolution* for the most part have been founded upon the facts observed during the *later period of developmental progress,* when many tissues, even the bones are already distinct; many investigators apparently not being aware that the early changes in the evolutionary process, are of great interest and importance. It is then, when no structure has as yet appeared, that the particles of living matter or bioplasts, of which at this time the embryo consists, are arranging themselves and are preparing for the structure-formation, and the development of organs which is about to occur, and which had been designed and foreseen from the very first.

The unseen vital changes which precede all structure-formation in living nature are the phenomena from the knowledge of which alone can we hope to be able to gain a correct idea of the wonderful vital processes which result in the construction of tissues and organs, of which there is not a

vestige in the early period of embryonic life. At this earliest period, all is structureless, and of the substances resulting from the death of the living matter, water constitutes the largest proportion. It is at this time that the most important *vital* changes are in operation, the vital powers determining which, have been inherited from organisms preceding, and are transmissible to the germs of those which are about to follow.

In development generally, and in each individual organism, progressing phenomena are recognized from the earliest period of the life of the germ, to the mature state of the living organism. In man, from early life, progressive vital action in the organism generally—is associated with *advance in mental power*, but which continues and increases, as youth leads on to adult life and maturity, and in some instances even in old age.

The living matter of the embryo of man at an early period of development could not be identified or distinguished from that of animals, although the unseen changes and preparation for the formation of man's organs so different in structure and power, proceed from the first according to a definite but different plan. During these early, and all important developmental changes, the living particles by which the several different tissues and organs are formed, are *without structure*, their chief constituent being water.

It is not in form, composition, material properties, colour or appearance, that the several embryos of the different classes and species of organisms in nature differ from one another, but in *vital power* which is undemonstrable—power which operates unseen and in darkness by which all growth and structure formation in the life world have been determined from the first beginning of life, up to the present time.

Can anyone doubt that this wonderful life-power has been handed down from living particle to non-living particle, or that the capacity of forming structure has uninterruptedly proceeded through the ages without a break, modified in some cases by the influence of external conditions, and as I venture to think also in obedience to the original capacity of the vital power, and to change in potency after a certain time, with which the primordial living matter was endowed at the time of its creation. But from the early period of development of the germ, man is man—animal animal—and plant plant; each kind possessing its own characteristic life-power, inherited from its predecessors.

I am sorry to differ very decidedly from the great majority

of my scientific contemporaries in this matter, and cannot help remarking, that about the middle of the last century there seems to have been a determination on the part of many authorities to do their utmost to raise *animal* and to degrade *man*. Was not man called a machine, and was it not said, that all his actions were mechanical? The learned philosophers of that day did not insult the ape by calling *it* a machine, but only their contemporary equal, *man*. There is not one part, or particle of anything living that in reason can be considered to be a *machine*. Every living particle *grows*. But what machine —what mechanism is there which has *not* been *designed, and its several parts* constructed, by man?

Think of the preparations required for the construction of any machine—the forming and fitting together of its several parts; and then think of the soft structureless living matter, and of the unseen preparatory stages, through which every living organism and all structures in living nature, must pass through, during their period of development and growth, as they gradually advance towards the short evanescent stage of completeness and maturity, which must be followed by death—most remarkable in insect life; where in fact we meet with three distinct phases of being, abruptly marked off from each other, but in each of which, special developmental changes, including the formation of complex tissues and organs, characterize grub or larva, chrysalis, and the complete, often winged, imago. Were it not for correct observation, the organism representing each of the three phases of existence, would have been regarded as a distinct creature, the latest phase, marking the highest and most advanced developmental form, as shown by its elaborate, and perfectly acting, tissues and organs, all foreseen from the first, although to this last stage, the nearest to perfection, death will soon succeed, and in some instances, even in a few hours.

In the vertebrata, long preliminary periods of unseen changes pass, before there is a vestige of structure-formation, during which the minute bioplasts are growing and grouping themselves according to the size and character of the structure designed, and as if it had been foreseen from the earliest moment of the life of the germ, or before that.

Living nature, it might be said, *everywhere* affords evidence of preparation for a *future*—promise of a living nature which is to be. And may not death itself be looked upon as a natural and necessary preparation for new life which is about to succeed? Just as in autumn and winter, do we not see

preparation and promise, in anticipation of the spring and summer that are to follow?

Few recognize the fact, that new living particles, sometimes with new powers, arise in the very substance of the living matter. These appear as very minute particles which gradually grow—and somehow acquire new powers which never come from the outside but always spring up *from within.* Growth never depends upon the apposition, aggregation, or collection of separate minute particles, being deposited on the *outer* surfaces of living matter. This vital movement *from within* occurs generally in the early developmental period of living matter. It also occurs all through life, and particularly in the living matter of the so-called "cells" in the cortex of the cerebral convolutions of man and animals, or on the brain surface, and in other nerve centres, from *within* living matter which already exists. This is all important; and, does it not suggest to the mind highly interesting possibilities, as to the precise seat of origination of new vital capacity, and of new and advancing mental power? Nor must we in this connexion forget the often sudden occurrence of new ideas, which seem to arise spontaneously in the mind, and even the "voice within"?

Every one who has carefully considered what he has observed of the living matter of a vertebrate embryo during the early period of its development, and has tried to reason concerning the facts of observation, will I think feel compelled by the evidence, to acknowledge the unceasing operation of Infinite Power, throughout the whole life world—no other inference appearing reasonable to the mind of an observer, who has seen and made himself acquainted with the facts. The countless numbers of separate particles of living matter or Bioplasm of which every embryo at this early period entirely consists, the arrangement of these particles in many groups, and the composition of the substances which result from their death, the large proportion of water associated with them while living and growing, being also noted as well as the *absence of all structure* at this early period—will I think satisfy the observer that the influence of life-power must be admitted, and the arrangements caused by life, recognized as the direct work of the God of Life—no other explanation having presented itself as possible, to the mind that reasons on the subject at this time.

I have myself had an opportunity of studying the living particles of the human embryo at early periods of its development. A few of the minute bioplasts from the collections in

different parts of the body representing the organs about to be formed, could not have been distinguished from one another, or from those of embryos of the lower animals; although the results of their development differ so widely.

Think of the remarkable differences of structure and action which would exist in a few short weeks, and the new powers of the bioplasts, as series succeeded series, and the yet more wonderful potencies of structure-formation to be manifested at the appointed time—surely evidence of the unseen designing and sustaining power of Omnipotence—the only reasonable explanation that can be offered by the student of these wonderful vital phenomena up to this time (1903). The living particles not only possess the power within themselves of giving origin to new living particles—these growing and in turn producing others—the vital powers of each series being different from, and in nature higher and more advanced, than those of their predecessors.

Shall we not place all these vital phenomena in a class by themselves absolutely distinct and separate from those of non-living matter, and the non-living Cosmos? Development, growth, and the formation of structure, cannot in fact be mechanical molecular or physical, but *must* be regarded as having been directly determined, foreseen and ordained by Infinite Power.

When I consider the general facts of life, whether from the point of view of the minute structure, composition and properties, of the tissues as formed in the various classes of organisms, from the lowly Protozoa up to man himself, or the early changes occurring during the development, particularly of man and the higher animals, from the collections of innumerable minute moist colourless structureless moving particles of living matter, each less than the one two-thousandth of an inch in diameter, I cannot but wonder at the general resemblance and simplicity of the appearance and constitution of the living matter, which when dead and subjected to chemical analysis, is found to consist of but very few elements, all through living nature. The evidence that neither the *living growth,* nor the characteristic tissue-forming capacity, is to be accounted for by the chemical composition of the dead matter, *but by life power only*, is conclusive.

From living matter alone can living matter of any kind be derived, and there is every reason to believe this has been so from the original creation of life; for it cannot be shown that life has been inherent in any atom or particle of non-living

matter yet discovered. There is no reliable evidence that one single particle of living matter has ever been produced or made from matter that was not alive, and that did not itself proceed from matter that already lived; and, as all individual life has certainly ceased in death, leaving the matter and its material properties behind, *must* it not follow that life as we know it in this world, can never be proved to be due to physical changes, or to any inherent properties or qualities of matter or of its elements, which do not live, or to the operation of any physical laws, conditions, or circumstances, yet discovered by man?

Let us ask whether there is any law or property in nature, which indicates any necessary connexion between life, and any definite elements of matter found in this world—in which world alone, as far as we can learn, there are constantly countless living particles and living organisms, growing, multiplying and dying, and being replaced by their successors—the very same atoms of matter, thus living and dying over and over again—the *matter* with its forces and properties persistent and unchanged, *remaining*—the *life* which for a time controls and rearranges material atoms, according to the wonderful life-power with which each kind of life has been endowed, existing for its allotted time only and then ceasing for ever—*Matter*, its physical forces and the laws by which it is governed apart from life—*Life*, a power *per se*, the *effects* of the operation of which man sees, and to some extent may understand, but which must in a short time cease in every individual living particle, and *without undergoing conversion into any kind of energy*. Life therefore *must* be a *power*, distinct from all material properties forces and agencies.

Can we then with our general knowledge of living nature, and of the intimate changes in life and growth, as revealed by minute research, give up our belief in God, simply because we have been assured by some recent scientific authorities, that we are but matter, and that we are animals; or believe that we are machines, formed by, and acting on the same mechanical principles, as those machines which man himself designs, and makes, repairs and improves? From all such doctrines, if guided by reason and facts of science and observation, we shall dissent, at least until the advocates of physical life bring forward stronger reasons for the acceptance of their conjectures, than they have yet been able to adduce. During the last century, physical doctrines of life were, in my opinion unreasonably and unjustly pressed upon the public for acceptance.

When the discreditable opposition to religious thought by which the nineteenth century was distinguished from all previous centuries, shall have subsided, and the occasional undeserved personal attacks on some science-teachers belonging to eductional institutions which like King's College, London, had been founded and conducted upon religious principles, shall have finally ceased, as before long they will cease, the soundness of our principles will be generally admitted, and the long hoped for reunion of religion and science will become, at least in England, an established fact. There will then be some prospect of educational peace being restored, and the unceasing progress of science-knowledge and learning resumed, and steadily develop among all classes without further interruption, and the unmerited condemnation of those who perceive in matter that lives, something, not in any way connected with any kind of non-living matter, force, material properties, or blind, passive, irresistible physical laws, will be forgotten.

Anyone who has seen and studied small particles of living matter growing dividing and subdividing in the fluid in which it lives, will certainly reject physical doctrines of life. No one can say how minute the smallest particle may be, that can divide and subdivide, *inherit* and *transmit* its special life-power. Many living particles that can be studied, being less than the $\frac{1}{10000}$th of an inch in diameter.

Fifty years seems a reasonable time for a student and teacher of more than one department of living nature, to have waited for the criticism of intelligent contemporary critics, of inferences he has been compelled to draw in the course of minute research conducted in one of the most important departments of science and human knowledge, having direct bearing on our views of living nature, philosophy, and religion; and therefore of the greatest interest to every person of intelligence.

The fact of being one of a rapidly diminishing number, I regret to say, of the Senior Fellows of the Royal College of Physicians and of the Royal Society, as well as of those of my own college which was the scene of my being taught, and of my teaching others. in minute Anatomy and Physiology, Pathology and the Principles and Practice of Medicine, from 1837, almost up to the present time—will I trust be received as an adequate apology for again craving the attention of the members of the Victoria Institute, to yet another dissertation on the difficult problem, in regard of which there are irreconcilable differences of opinion; and with their permission, of appealing to the

thoughtful, and especially to the scientific members of my profession, who are necessarily much interested in this all-important question of the nature of life. May I hope that some of the general conclusions I have advanced, may at last meet with the free criticism of those who have studied the question, and may have drawn inferences different from my own?

The reunion of religion with that department of science which is of the highest importance to the health and well-being of mankind, in every part of this world, has been firmly established in our own time. I mean, the reunion of the science and practice of medicine and surgery, with religion, which has for many years been growing in strength as well as in the number of its advocates and supporters. May this reunion soon include all who recognize true science, and the importance of some knowledge of life and living nature! By further scientific investigation, it is certain that new truths will be discovered, which will probably show that advance in scientific knowledge is intimately connected with, if not inseparable from, the progress and spread of religious thought.

I look forward with confidence to the union of scientific and religious views of living nature, and hope for the support of the thoughtful of different religious opinions, and that many will join in acknowledging the evidence we now have of the infinite sustaining, as well as of the creating, power of the God of life, the living God of the kingdom of life; and of the absolute separation of all life from all non-life in creation, from the very beginning, of which beginning, nothing more has yet been revealed to us by modern research than we are taught in the first five words of the Bible.

The life power of which probably most thoughtful students of science are conscious, can only belong to human life. It is this alone by which man is enabled to investigate the phenomena of life and vital action of all kinds of living organisms and to appreciate the mighty differences by which man's life power, has ever been distinguished from that of the rest of living organisms.

By the "living particle" so often spoken of, especially those particles belonging to man, I mean particles of soft structureless matter already described, and consisting principally of water, which are destroyed by the slightest touch, and by being removed from their natural position, and also by being placed in water or exposed to the air for a very short time. Such are the living particles present in all our tissues and organs as long as we live, in truth by the agency of which alone we live and move and

think. In many organs these living particles act together in groups of many thousands, each individual particle being generally less than the $\frac{1}{2000}$th of an inch in diameter, and there is no reason to suppose that ancestral life particles differed in character, or principles of vital action, from those of to-day.

I have tried my utmost over and over again, to consider living nature from the point of view of modern Agnostics, Monists, Free-thinkers, and according to the doctrines of some who belong to parties and subdivisions, sections and subsections, old and new, high and low, broad and narrow; but I have failed. I have never been able to get the simple question of life and death, or the action of any one particle of living matter adequately discussed, though it is familar to every Biologist; because discussion on the fundamental questions bearing on the nature of life and the living world, has long been opposed.

How then is it possible for me not to believe in *Life Power* as distinguished from the properties of matter—life power which ceases, or which may increase and multiply, and by which new matter may be animated or caused to live—and matter left after the death of that which was alive?—Life Power, and lifeless Matter.

If this be true, must we not admit two very distinct states of matter, *living* and *non-living*—two states of nature—*living* and *non-living*—two realms, or kingdoms—one living, of *Power*,—the other not living, of Matter—one *temporary*, always changing—the other permanent and indestructible—one *governed by the living God*, the other *by non-living law*? *Life power* infinite, active, living and dying—Matter passive, blind, powerless—governed by eternal unchanging law?

In this paper I have endeavoured to make clear what I believe to be the truth as regards the absolute distinction between all living and non-living; and have tried to prove the distinction of all life from non-life.

As regards man, I could but express my very strong conviction that man is absolutely separate from all the lower animals; but believe me, there are very strong facts and arguments against the doctrines now generally entertained, concerning man's nature and origin, and his relation to the Infinite. I hope, therefore we may have opportunity of discussing at greater length the important question of Design, human and divine, and man's true position in living nature, from the science side, based on facts and observations ascertained in the course of studying the structure growth and action of the living matter of his body, and the structure, mode of formation, and action of the highest

and most remarkable of his tissues, and particularly of the arrangement and action of those bioplasts and tissues belonging to man's nervous system, not to be compared with anything else in nature, from which perhaps we may be able to deduce what is man's true place, and his relation to his Creator.

I regret to say that some intelligent writers of our Press, the most free and in some matters, the most reliable in the world, seem but too anxious not to offend their readers who may differ in opinions according to the parties, denominations, sections, divisions, or sub-divisions, to which they belong; and generally, in their occasional criticisms of scientific questions there are indications of a desire, not to express opinions that would be likely to offend their readers' views; and so to study the tendency of the thought of the day, on questions of religion and science, as to avoid the discussion or criticism of serious questions bearing on the nature of life, and the relation of living nature generally, to Infinite Power Wisdom and Goodness. The general Press seems to take what it calls the secular view; as if even the simple question of life and death of man could be secularly treated, without reference to its religious side, and to the question of the creating and sustaining power of the living God; and as if a sharp distinction could be made between the supposed *secular* and *religious aspects* of Life power.

For nearly a century very arbitrary assertions by high authorities of their time, erroneously supposed to be based upon new discoveries, have been thoughtlessly forced into popularity, and have so modified and weakened the foundations of religious belief, as to have led many intelligent persons who could not investigate and judge for themselves, to accept and spread doctrines, incompatible with belief in God and the spiritual world,—doctrines which have tended to shake or destroy religious feeling in England—all this too, without serious discussion and proper deliberation, on the part of those who were well acquainted with the scientific facts.

The life-power, mind, and intellect of man, have been placed in one and the same category with the life power and instincts of the lowest animals, although it is certain that man is a being apart, and absolutely distinct from all other organisms in living nature.

Of those who agree with the so-called Freethinkers, Agnostics, Secularists, or Monists, and of those scientific men who support the views advocated by that eminently representative but disquieting author of "The Riddle of the Universe," I beg to enquire:—what results of investigation, general or microscopical,

physical or chemical, and what known facts, or scientific opinions, arguments or reasons based on research, in any department of living nature or of physical science, can be advanced, which would justify an unprejudiced student of Physiology or Biology in defending the contention, that man cannot in reason, from a scientific point of view, be in any sense regarded as "the child of God," or as "an inheritor of the kingdom of heaven"; for is not man the only living being who *knowing* God, can pray and worship?

DISCUSSION.

The CHAIRMAN.—I am sure we have all listened with the deepest interest to this Paper (hear, hear), and we shall read it with the greatest interest when printed.

It is most important that we should bear in mind this one fundamental point which underlies this valuable paper—that life springs from the living and not from the non-living. It is true that there is a great deal of loose talking about it. So with growth, we may speak of the growth of a crystal, and no great harm is done if we recollect that we are using the word in an inaccurate sense;* and so, in many cases, we get into a way of using words figuratively, and then supposing we have proved a thing; and I believe figures of speech, by way of illustration, to have been amongst some of the most fatal sources of error in scientific study. We use the word "life" in an inaccurate sense, but we must come back to those points which Professor Beale (and perhaps he is better qualified to speak than any man in England on these physiological questions) forces on our attention, that the living, though even a minute fraction, perhaps, of what we call living, contains in that minute fraction the secret not only of life itself, but all individual life. The charm of studying organisms led many to suppose, when I was a student, that in organization is the secret of life, whereas in life is the secret of organization. (Hear, hear.)

* As Dr. Beale has himself explained, the growth of a living object is from within; the "growth" of a crystal is by accretion from without.—ED.

Now, the important proof in our investigations, to my mind, lies in the absolute certainty, as I hope it does to yours, that there is something that we do not know. It is important, then, to come to that knowledge if it will save us from infinite mistakes. Our late distinguished President always impressed me, when speaking on a scientific subject, by the absolute humility with which he said he did not know, and, therefore, it seems that until we are willing to confess our ignorance of what life is, from a scientific point of view, we shall know nothing of it.

I most earnestly commend this paper to your careful attention. The conclusions that are drawn in it by the author are so entirely —perhaps I should not say what I agree with, for I am incapable of following all those masterly arguments—but I have felt, following them at a distance, that they show clearly there is nothing that can conceivably explain the mystery of life without the Living One outside. How can I express it? The Living One Who is not the living thing, but the *source* of the living thing. We come back to the words of Holy Scripture, where God is spoken of as Him in whom "we live and move and have our being."

Let us hope that in the confession of our ignorance we may rise to higher truth—that we may rise from not knowing the difference between the dead and living, or the physical and spiritual, to the higher and deeper knowledge of the spiritual.

Rev. F. A. WALKER, D.D.—If I might select one or two points out of the admirable and learned essay we have just listened to, I should be very glad to put to the author this question: What is the lowest degree of cold that he thinks living organisms can exist in, and the highest degree of heat?*

Dr. WOOD-SMYTH.—This is the first time I have had the privilege of attending at the Victoria Institute, and it has been a great delight to me to hear Professor Beale on this subject, because the most exhaustive researches I ever made in my life were made years ago on the lines of his work.

I went over his experiments, one by one almost, and found them,

* As Dr. Beale does not appear to have given a direct answer I may suggest—between the temperature at which albumen coagulates (165° F.) and the zero of Fahr. for unprotected animals.—E. H.

as he represented them, perfectly true. There was one drawing in his book that I remember well was open to grave suspicion. He represented germinal matter, spinning a fibre of muscle, much as a spider does his thread. But in the course of my research I came upon this very object. If anything, it was more clearly marked than the one illustrated in Professor Beale's book. It is a most important discovery, and it is impossible for us to estimate its value. If you take the whole of Professor Huxley's discoveries together they will not equal that one discovery, and yet nothing is thought of it on account of the wrong-headed attitude which men of science entertain towards this great subject. Let me say that there is a change of opinion. Herbert Spencer, in the last edition of his *Biology*, gives up generally, the chemical theory of life, and says it is an enigma.

It may be slow, but the time will come when Professor Beale's views will be accepted. It has taken a whole century for hypnotism to be admitted, as it is to-day, to be a potent influence and power in mind. All this is very useful to be brought before the Institute, and I hope it will tend towards a victory for Truth and for the Bible.

The only explanation of life which we have is the one that is given to us in the Book of Genesis where it says, "And the Spirit of God moved upon the face of the waters." The Hebrew word there is a participle expressing continuity and intensity of vitalizing action.

REV. A. K. CHERRILL.—Professor Beale has given us so much, that I cannot help feeling inclined, like a certain well-known character in fiction, to send up my plate and ask for "more"!

There are two points on which I would like to ask him a question—first, as to the structureless matter of life of which he has spoken. Are we to understand that what he refers to is actually structureless, or that we are unable to discover the structure? In his description of the commencement of life he speaks of most elaborate structure, and it is difficult to see how this very elaborate structure can come out of no structure at all.

MR. MARTIN ROUSE.—I was going to ask Professor Beale to reassure us, or to reassert, in terms that escaped me, whether the growth of matter within a cell was all performed within the cell—whether the whole growth takes place within the cell?

Professor LIONEL BEALE.—Yes, from within outwards.

Mr. ROUSE.—Whereas in all lifeless matter, the deposits are from the outside?

Then I would ask Professor Beale whether the chemical compounds of these bioplasts, that form man as well as other animals, are absolutely the same?

Then I would say it is monstrous and absurd to speak of man as a machine, for the simple reason that a machine never grows, even regarding the cell itself as living matter, which we now know it is not, but even regarding a cell as living matter, it of course affords no analogy in the inorganic world.

Then I would say, on the theory of development and complete evolution, why should all insects have exactly three stages? If this theory really had any true existence, one kind of insect would have two forms, another three, another four, and another five or six and so on, and they would be variously developed up to higher and higher perfection; whereas there are innumerable thousands of species, each one of which has exactly three forms or stages. [Hear hear.]

Rev. JOHN TUCKWELL, M.R.A.S.—I should like to say how deeply indebted I feel to Professor Beale for that extremely thoughtful and splendid paper that he has given us this afternoon. No doubt in all our minds many questions have arisen, and I am sure there are many that cannot yet be answered. Professor Beale has told us how difficult many of those points are.

I was particularly glad that he called attention, however, to the commencement of life. Our globe is said to have been at one time a mass of molten matter, and it is always difficult to understand how, upon the materialistic ground, there can be any connection between the first germ of life and the moist ashes of a burned world. Professor Beale has, I think, rendered great service in calling attention to the extreme difficulty of accounting for the first germ of life on the theory of evolution.

Another point I am very thankful for his calling attention to, is what I may refer to as the higher development of the higher species. If, as we are told, every germ of life that propagates itself can only result from similar life of the same form, or class, then the difficulty is to understand how, by any process of evolution, the bioplasm of the plant can ultimately become animal bioplasm, or how

animal bioplasm can ultimately become human bioplasm. If there is a vital principle in every particle of bioplasm that determines its future character, how are we to reconcile that principle with the development of higher species from lower?

Professor ORCHARD.—We have to thank Professor Lionel Beale for a very masterly and fascinating paper.

Before I make any observations on the subject of the paper, which at this late hour must be very few, I wish warmly to associate myself with the tribute of affection that has been paid to our late President.

He served his generation, by the will of God, and now the Christian philosopher has entered into that life which is above the brightness of the sun. While we sorrow over our own loss, we cannot but rejoice in his gain.

It struck me while listening to Professor Beale's paper, that its especial value consisted in its discriminating power. It discriminates between the assumptions and fallacies of evolution and the facts of science. It discriminates between regarding man as a machine, and the actual fact that he has a will and is a living growing creature. It discriminates, again, between growth and mere accretion. It is important that we should have these matters brought before us in contrast to mere speculative assertion.

That life is distinct from mere mechanical force is, I think, generally admitted. You cannot translate mechanical forces to life; nor can you translate life into the equivalent of those forces.

Since Professor Japp gave his famous address, I think few if any (I do not know whether Professor Pearson still holds to his view) will dispute the tolerably strong evidence of those forces that life is an energy which testifies to a living God and His work.

I thank Professor Beale much for his valuable paper.

Professor LIONEL BEALE, in reply, said,—It would be difficult for me to enter into a consideration of the many interesting questions that have been asked, for it would occupy a great deal of time, but it suggested itself to my mind whether we could not, with the permission of the Council of the Victoria Institute, have a short conference in which one of those questions might be started amongst us; when we should be able, probably, to unravel a great deal of difficulty and to come to some definite conclusion that might be of great use. Is it possible?

The CHAIRMAN.—It requires careful consideration. If it were possible it would be most interesting.

Mr. MARTIN ROUSE.—Cannot that question be answered about chemical compositions?

Professor BEALE.— The chemical composition of bioplasm cannot be determined, because in the attempt you kill it. When you try to find out what it is made of, the first thing you do is to destroy it. It is a certain product that results from death.

Mr. MARTIN ROUSE.—I have heard you say that before; but I wondered whether the vital products of the dead matter that are introduced into the formation of man were the same as those that are introduced into the formation of animals?

Professor BEALE.—Pretty nearly.

Mr. MARTIN ROUSE.—If you were to select 20, or 100, or 1,000 cells and test them chemically, in animals, would the result be the same?

Professor BEALE.—Pretty nearly. It is the *living power* that is transmitted from one to the other, and so with regard to every word we speak. Probably thousands of "cells" are at work at the same time, and those cells come into existence certainly at the same time, and act harmoniously together although they are separate.

All these questions are very interesting, and I should be glad to have the opportunity of meeting our friends to discuss them *seriatim*.

ORDINARY GENERAL MEETING.*

COLONEL MACKINLAY IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed.

The following elections were announced :—

MEMBER :—Rev. George Sidney Streatfeild, M.A.

ASSOCIATES :—Rev. B. N. Switzer, M.A. ; Samuel A. Lawrence, Esq.

DEATH OF THE LATE PRESIDENT, SIR GEORGE GABRIEL STOKES, BART.

The CHAIRMAN.—I will ask the Secretary to state that the Victoria Institute has been represented at the funeral of our late President, Sir G. G. Stokes, by Mr. Martin Rouse and himself, who had been deputed by the Council for that purpose.

The SECRETARY (Professor EDWARD HULL, LL.D., etc.)—I may just state that in accordance with the resolution of the Council Mr. Martin Rouse and myself attended the funeral of our late distinguished President, which was conducted at the University Church, Cambridge. I need not say it was attended by the representatives of nearly all the Learned Societies of London, Cambridge, and Oxford, and by the representatives of the former University. The whole service was exceedingly impressive, and we were pleased to have the opportunity of representing the Institute on that solemn occasion.

The CHAIRMAN.—We now come to the purpose for which we are assembled this afternoon, viz., to hear Professor Hull, our Secretary, read a paper. He has given us many papers in the past, and this, I feel sure, will be of interest.

Monday, 16th February, 1903.

THE CHEESEWRING, CORNWALL, AND ITS TEACHINGS. By Professor EDWARD HULL, LL.D., F.R.S., F.G.S. (*Secretary*).

DEVON and Cornwall are remarkable for the number and variety of objects of nature and art which are presented, at intervals, to the notice of the observer both along the coast and in the interior. In the former case, we have grand examples of cliffs and precipices hewn by the ceaseless waves from the Atlantic out of the hardest rocks, either plutonic or stratified, these latter being often contorted, folded and faulted, or pierced by caves and gullies; in the latter, we have numerous examples of prehistoric art in the form of stone circles and dolmens, such as the Trevethy Cromlech near Liskeard (Fig. 1),* and of early Christian art in the cases of stone-crosses, churches, castles, and fortresses, of which Tintagel, the traditional stronghold of King Arthur and his "Knights of the Table Round," immortalized by Tennyson,† is the most interesting example.

But our task here is to deal only with a work of nature, long antecedent to the oldest of these monuments of bygone art, so

* I use the general term "prehistoric" for the stone circles, but it must be remembered that Fergusson maintains that there is no evidence of their existence either in England or France in the days of the Roman occupation. *Rude Stone Monuments*, p. 20 (1872).

† "The Coming of Arthur" (*Idylls of the King*).

remarkable in form and outline as at first sight it might be regarded as the work of man, a monument erected over the grave of some prehistoric giant by his brother "giants of those days" who have left their monuments in the stone circles and dolmens of Britain and Western Europe. But a closer inspection dispels this illusion; and we ultimately recognize



FIG. 1.—THE TREVETHY CROMLECH, NEAR LISKEARD.

that in the granitic pile of the Cheesewring and its companions around of lesser sizo we have noble specimens of natural monoliths the origin and mode of formation of which offer subjects worthy of the investigation of geclogists and students of nature.*

The Cheesewring.—Rising from the granitic moorland about seven miles north of Liskeard in the centre of Cornwall, is the

* The Cheesewring is figured and described by the Rev. W. Borlase, F.R.S., under the name of "The Wringcheese," and he gives its height as 32 feet from the ground. He appears to have considered it as partly of druidical origin. (*Cornwall*, vol. ii, p. 165.) The Cheesewring is also figured (Fig. 190) and briefly described by Lord Avebury, *Scenery of England* (1902).

remarkable pile of rock known by this name. It is the largest of several tors of similar granitic material, standing upon a platform about 20 feet above the general surface of the



FIG. 2.—THE CHEESEWRING, NEAR LISKEARD, CORNWALL.
From a photograph by Mr. W. H. Ruddy, Liskeard.

moorland, and owing to its form and position has given rise to much speculation regarding its origin and mode of formation.

It is mentioned in Woodward's *Geology of England and Wales* as one of the tors near the granite quarry from which the stone used in the construction of the London Docks and Westminster and Waterloo Bridges was obtained.*

To turn from the geological to the popular idea of the nature and origin of the Cheesewring, we have only to quote the views of the late Mr. Wilkie Collins in his entertaining narrative of *Rambles beyond Railways*, written half a century ago,† which is amusing and instructive as indicating the crude ideas which prevailed on such subjects at that time. Discarding the druidical theory advanced by "certain learned men," to wit, I presume, Borlase and those who adopt his views, he proceeds to give what he considers to be the correct geological explanation of the origin and mode of formation of this natural monument. According to his view of the subject it is assumed that the Cheesewring and all the adjacent upstanding masses of stone "were once covered, or nearly covered, by earth, and were thus supported in an upright position; that the wear and tear of storms gradually washed away into the valleys all the earth from between the rocks, and then left such heaps of stones as were accidentally perfect in their balance on each other to stand erect, and such as were not, to fall flat on the surface of the hill in all the various positions in which they now appear." In this account of the formation of the Cheesewring and similar tors we seem to have an illustration of the proverb "*ne sutor ultra crepidam.*" Mr. Collins was a writer and novelist, but not, I fear, a geologist; and hence the amusing attempt to explain on geological principles the origin of the Cheesewring and similar Cornish tors. In fact, it will be observed that he starts with the assumption that these isolated rocks were in existence before being "covered with earth"; but their origin still remains to be explained. Mr. Collins, however, deserved credit for recognizing that the Cheesewring is a natural monolith, and not to be classed with the dolmens, or cromlechs, such as that of Trevethy, which has been erected at a short distance to the southward, near St. Clair's Well.

It is now time that I should proceed to describe the Cheesewring, and discuss its origin and mode of formation—a task by no means easy, and which cannot be done without taking a

* 2nd Edit. (1887), p. 575. De la Beche has omitted reference to it in his standard work, *The Geology of Cornwall, Devon, and Somerset* (1839).

† R. Bentley (1851).

rather distant retrospect into past geological times. And first as to its form and composition. In form it consists of five disconnected, or partially connected, slabs of tabular granite, large and massive in the upper part, while supported below as on a pedestal by slabs of much smaller dimensions. The total height from the base is, as stated by Borlase, 32 feet, and it rises from a granitic platform, or flattened dome, elevated about 20 feet above the general surface of the moorland. At its base lie large blocks and slabs of granite, and at short distances, several similar monoliths of smaller dimensions. Thus the Cheesewring is conspicuous from a considerable distance over the moorland to the south; and just under the south side of the tor is the large granite quarry to which reference has been made above. In this country of remarkable works of ancient art, such as standing-stones, old crosses, druidical circles, and dolmens, the Cheesewring rises pre-eminent as a conspicuous work of nature.

Composition and Mode of Formation.—In the endeavour to arrive at some theory regarding the mode of formation of the Cheesewring and similar isolated granitic masses, we get some assistance from a view of the face of the quarry which has been opened near its base.

The whole mass consists of largely crystalline grey granite; and on observing the wall of rock which has been cut back almost perilously near to the base of the Cheesewring, it becomes clear that the rock belongs, as regards its structure, to that variety known as "tabular granite." In the upper part of the wall distinctly horizontal "planes of cooling" are seen to have been developed, giving the mass a stratified, or bedded, appearance. Granite with similar tabular structure is not uncommon. I have seen it myself in the Mourne Mountains in Ireland; but the planes of division are sometimes inclined to the horizon. De la Beche and Dr. Boase have recognized the structure in other parts of Cornwall and Devon, and have pointed out how this structure gives rise to the formation of tors or carns as on Dartmoor.* Lord Avebury has also pointed to this structure in the Logan Rock on the Cornish Coast.†

Planes of Cooling in the Granite.—We have now to inquire, what do we mean by "planes of cooling and solidification in

* Report, p. 163. Similar tors have been developed on Kinder Scout in the massive beds of millstone grit, which have a composition similar to that of granite, though of course of entirely different origin.

† *Scenery of England*, p. 432.

granite"? Numerous observations amongst rocks of igneous origin have shown that when such planes have been developed they assume a position parallel to the outer surface of the mass, whether this has been the atmosphere, or an envelope of previously existing rocks into which the molten mass has been intruded. In the case of Devon and Cornwall the granite has undoubtedly been intruded amongst rocks of Devonian and Silurian age, and may not originally have reached the surface of the ground; or only at rare intervals. This is a point on which we cannot speak with certainty; but of this there can be no doubt, that such a rock as granite, coarsely crystalline in structure, could only have been consolidated from a molten state with extreme slowness; which would be the case if it was overlain by large masses of previously existing stratified rocks, or by outer portions of its own mass which have been removed from off its surface by denudation. Molten masses which have been extruded at the surface of the ground cool and consolidate with comparative rapidity, and are consequently vitreous, micro-crystalline, or granular in structure, although of similar chemical composition to granite itself. Of such we have examples in the "dolomite" of the Puy de Dôme and other volcanic hills in Central France. This rock has cooled and consolidated at the surface of the ground; and as a result it is micro-crystalline or granular, though containing small crystals of mica and other minerals. But it is owing to an original envelope, or covering, of solid material, whether of stratified rocks or of part of the granitic mass itself, that the structure of the granites of Cornwall and Devon is coarsely crystalline, the crystals of felspar, mica, and quartz being well developed; the quartz, however, generally occurs as the paste in which the other minerals are enclosed.

Evidences of Denudation.—The evidence that denudation has taken place to an enormous extent over the Devono-Cornish area meets us at every step along the coast, and especially the north coast of this great promontory. Wherever we examine the coast-cliffs along the western shore fronting the Atlantic, we observe the strata rising from the waters, generally at high angles, or contorted and folded in a remarkable manner, as at Boscastle, Bude Bay, and Clovelly. But whatever may be their position, they invariably terminate upwards along a nearly horizontal or slightly inclined plane extending inland from the coast, and when viewed from a distance, looking almost like a horizontal line against the horizon. This upward truncation of the strata, bed over bed, means, of course, that they were once

continued into what is now the air; these vanished masses having been planed off the surface by the waves of an ocean which once swept over the existing land when at a lower level than at present, leaving an inclined plane surface known as "a plain of marine denudation."* This term was first proposed by its author to the surface of the Silurian district of Cardiganshire, which, though consisting of alternating hills and valleys formed of inclined Silurian slates and grits like those of Cornwall, terminate upwards along an *imaginary* plain surface, sloping gently from the interior to the sea-coast. (Fig. 3, p. 147.) To this subject we may well give our attention for a short time, as it is one of great physical interest.

Plains of Marine Denudation.—Everywhere in the south and west of England and Wales we are confronted by plains of marine denudation, a term first employed by Sir Andrew Ramsay.† Let me illustrate what I mean by this term. Supposing the British Isles and Western Europe to be elevated from 100 to 200 fathoms above their present level as determined by the surface of the ocean, they would be found to have a fringe of varying breadth consisting of a gradually sloping surface bounded inland by the coast cliffs and breaking off in the direction of the ocean, by an abrupt declivity (or escarpment) leading down to the abyssal regions. This gently sloping fringe, sometimes 20 to 100 miles in breadth, would, therefore, constitute a plain, and as it was formed by the ocean waves and currents, ever wearing back the coast, breaking down the rocks and reducing the surface of the land to that of the surface of the ocean, it would constitute a plain of marine denudation.‡ This plain would at intervals be crossed by river-valleys descending from the interior lands into the abyssal ocean below. Such plains are also represented on the land, wherever the land has been, at whatever period, below the

* The name proposed by the late Sir A. C. Ramsay in his work, *The Physical Geology and Geography of Great Britain*, 5 Edit., p. 497 (1875).

† *Ibid.*, p. 497. This term in the abstract might be written "planes of marine denudation"; but in the concrete as applied to special features of the landscape the term appears the more correct.

‡ The process of formation of this plain, constituting as it does the land margin of the Great Continental Platform, is admirably illustrated in the picture of Widemouth Bay, Bude, in Cornwall, given by Lord Avebury in his *Scenery of England* (p. 126), where the highly tilted and contorted strata of Devonian age, as seen in the coast cliffs, are planed down by wave action to a general surface sloping gently seaward, and laid bare at ebb tide.

surface of the sea; and, as, I have said, there are frequent examples of these once-submerged plains, as, for instance, in Cardiganshire, of which the accompanying figure taken from Sir A. C. Ramsay's work is a representation (Fig. 3). What



FIG. 3.—SECTION TO ILLUSTRATE STRUCTURE OF A PLAIN OF MARINE DENUDATION.

Generalized Section across the Silurian Strata of Cardiganshire (after Ramsay).
Phys. Geo. and Geog. of Great Britain, 5 Edit., p. 497.

is specially remarkable is the fact that the plains are quite independent of the nature and position of the rocks; they are carried across hard rocks and soft, highly inclined or contorted as well as nearly horizontal strata; though of course the harder rocks have withstood the marine action better than the softer. Thus in the valley of the Avon at Bristol we see the solid beds of Carboniferous limestone rising in succession from below each other, but terminating abruptly at the sky-line in a flat surface or plateau, through which the river-valley has been eroded by the action of the river itself in the course of ages. The Carboniferous, Devonian, and Silurian formations of South Wales, generally highly inclined, terminate along a nearly level sky-line as seen from the Gorge of the Avon to the north. Further to the east we have the remarkable table-land of the Cotteswold Hills of Gloucester and Somerset, breaking off towards the west in an elevated escarpment rising above the vale of the Severn. Finally, when we come to Cornwall itself, the subject of more immediate interest, we find that the surface of the country resolves itself into a gently sloping table-land commencing in the coast cliffs, penetrated by numerous valleys descending into the sea, and composed of various strata of Carboniferous or Devonian age, which have been highly tilted, or thrown into numerous folds and flexures, but which break off along the sky-line, the once continuous portions having been as completely swept away as if they had never existed. But we have only to attempt to restore the vanished strata along the lines of dip and flexure to become convinced that thousands of feet have been denuded from off the existing surface of the country.

It is clear from what has been said that this erosive action has been effected by some agent acting horizontally, breaking down and carrying away the materials which once overspread

the existing surface; and when we ask ourselves—what agent in nature is capable of such powerful action, we can only reply, the waves of the Atlantic Ocean, impelled chiefly by westerly winds, acting on a gradually subsiding land area, aided by the tidal and other currents which take up the fragmental matter and carry it away to the outer depths of the ocean to form new strata.

Now, the granitic areas of Devon and Cornwall have, like those formed of stratified materials, been subjected to the agency of denudation, so that the present surface of these areas is altogether different from the original surface after consolidation. Much material has been eroded and carried away since consolidation at former periods, chiefly at the close of the Palæozoic or Primary period. During the cooling and crystallizing process there may have been portions of the mass protruding into the overlying rock further than others, or they may have been of firmer consistency, and such portions would (*cæteris paribus*) resist denudation to a greater extent, and remain conspicuous above the adjoining areas. All this is conceivable; but I do not pretend to precision in a matter so enveloped in difficulties and obscurity. It is permissible, however, to suppose that on the retiring of the sea by reason of the elevation of the land, such more solid masses would be left as isolated pillars, or sea-stacks, to the action of the atmospheric agents, whether frost, rain or wind; disintegration would ensue, and decomposition along the joint planes. In the case of such granitic tors as the Cheesewring, where, as we have seen, there is a tendency to split along horizontal planes, the ultimate result would be to produce such natural monuments as the Cheesewring itself, and its companions of less elevation.

Such is the explanation which I venture to offer for the formation of this fine granitic tor. Some of the points in the reasoning are inferential; others are capable of demonstration, such as the extent to which denudation has acted over the surface of the country, removing perhaps thousands of feet of strata and rock which once were superimposed on those now forming the surface. Of this denudation we may say, when standing on the surface of the moorland in sight of the Cheesewring, "*Si monumentum quæris, circumspice.*" Of its kind, few more noble monuments can be found in England.

Discussion.

Dr. Logan Jack, F.G.S.—Professor Hull has given us a most interesting and suggestive explanation of this remarkable natural

monument. He has interpreted it to us by means of one of those "sermons in stones" of which we constantly hear, but of which we do not very often understand the language. Professor Hull is, however, an adept in that language, and his explanation, I need hardly say, is singularly clear and explicit. The great lesson which has been taught to us undoubtedly is that of "denudation."

Shakespeare's great mind, I believe, grasped the whole subject of sub-aerial denudation when he wrote, "Time makes mountains level, and the continent, weary of solid firmness, melts itself into the sea." He saw the whole process going on—how a plain, subject to sub-aerial denudation, might become carved out and utterly worn away till the whole mass would be reduced, as it ultimately might be reduced, to the level of the sea, unless there were some compensating elevation.

Very much has been said about the dependence of features of scenery upon geological structure, and no doubt those features do depend, in a remarkable degree, on geological structure; but one of the most forcible lessons brought before us by this "sermon in stones," which has been interpreted to us to-night, is, if I may say so, how independent scenery can sometimes be of geological structure. You would naturally suppose that these contorted strata (as drawn on the blackboard) would form, when they were bent into a saddle, a valley, and when they were bent into anticlinal axes, a hill; but there is a good example in the lower part of this small diagram of the reverse being the case, where a little valley is carved out on the top of the anticlinal axis. That exemplifies the *independence* of the scenery to some extent. At the same time there may be a deeper meaning in it, and there may really be dependence. For instance, it is well known that the tops of anticlinal axes are more or less shortened, like the reefs of Bendigo and some of the Australian fields. These shortened anticlinal axes may have given direction to the forces which eroded the valley in that instance, though the contrary appears to be the case.

Then, again, in the section of the Avon drawn on the board it is seen how the valley is carved out of the escarpment at right angles to the strike of the strata and the level summit of the cliffs which is made by the truncated ends of the strata of limestone.

As to the Cheesewring, it is a very remarkable and picturesque example. There are many such, but in England there are, perhaps,

few that are more remarkable than this. The origin of them is always mysterious, but this explanation given by Professor Hull seems to be very reasonable and feasible. In general, though, I have observed, and it has been my business to observe, in Australia and the East a good many mining operations, and in those frequently tunnels are driven and shafts are sunk in the decomposed granite. Invariably it is found to be the case that decomposed granite always contains some harder portions which are met with in a way which I am quite unable to explain.

I should like, before I sit down, to ask Professor Hull about the Logan Rock mentioned in his paper. My acquaintance with England is somewhat old, and I have forgotten some of the things I have read; but my impression is that the Logan Rock was, for a long time, understood to be an artificial monument—that it was a rocking stone, in fact, balanced finely upon a point, and that it was dislodged from that point by some mischievous persons a good many years ago. I would like to ask Professor Hull if the Logan Rock to which he refers is the one of which I have a vague recollection.

Mr. David Howard.—I think that everyone who knows Devon and Cornwall will appreciate the extreme interest of this paper, not merely from the question of the particular Cheesewring it deals with, but the light that it throws on the whole geology of those counties, or, to use that dreadful expression, their "physical geography." Nothing strikes me so much as the dulness or flatness of the upper level of Cornwall, and the wonderful beauty of the valleys cut out in the lower portion at a much later period. Denudation has been at work in two such totally different ways, a contrast which I think of great importance, because very often, without a special knowledge of geology (and a little knowledge of this branch of science, like others, is a dangerous thing), it leads one to suppose that we must look only for denudation which is at work at the present day. In Devon and Cornwall, and especially in Cornwall, there is an old sea-bottom, so to speak, and you see the rocks standing up by themselves, leaving a comparatively flat floor, and in the lower portion you see the effects of the rapid running water flowing down from a higher level and eroding the valleys on its way to the sea.

As to why granites are sometimes harder and sometimes softer, we are met with the great problem how granite came to be granite at all. The construction of its crystals is due not only to cooling,

but, I think I am right in saying, the presence of the vapour of water. It evidently must have been brought about under pressure, or it would not have been granite at all.

Rev. F. A. WALKER, D.D.—On one page of the paper the learned lecturer states, "More solid masses would be left as isolated pillars, or sea-stacks, to the action of the atmospheric agents, whether frost, rain or wind." I suppose we have plenty of examples in the Scilly Isles and portions of Land's End of those pillars as the result of centuries of atmospheric action and corrosion, and I would ask Professor Hull if he regards the brine as a potent agent in the decomposition of granite; because I know in very distant ages we have an old authority as to the decomposition of granite by brine. It occurs in Herodotus—*ἅλμην ἐπανθέουσαν ὥστε καὶ τὰς πυραμίδας δηλέεσθαι.* Herodotus, Euterpe, Lib. II, chap. 12, "efflorescence of brine causing the very pyramids themselves to be corroded,"—and he refers to the variegated Ethiopian stone (red granite) which forms a portion of the casing of the second and the whole of that of the third pyramid. I would say that I noticed some curious effects of that corrosion by brine in several objects I brought with me from Upper and Lower Egypt years after. The saltpetre crops up, and in the specimens I have brought this saltpetre was at work for a long time after, rendering the labels illegible and reducing the trays in which the geological specimens are placed to pulp, and it is indicated in this ancient massive monument by the Father of History.

A VISITOR.—May I ask if there is any law or regulation for the preservation of geological relics like these at all?

Professor HULL.—I should hope that the local County Council will have the preservation of the natural and artificial monuments under their care. That is all I can say. Of course we know that Stonehenge has now, after many centuries of neglect, been put into a state of safety.

The CHAIRMAN.—Before calling on Professor Hull to answer these questions, may I ask a question myself? May I ask whether a stone is made of exactly the same material as the ground underneath —*i.e.*, as to a stone not brought from a distance—and are the planes of cooling in the Cheesewring parallel with those in the granite rock beneath it?

[The Chairman illustrated his meaning on the blackboard.]

Professor HULL.—Very much so, yes. I am much pleased with the discussion, and I am especially pleased that Dr. Jack is able to coincide with the views I have put forth.

What he says with regard to the dependence of natural physical features and independence is perfectly true, and it is sometimes very difficult to know why we have both. In such a case as the table-lands of Cornwall and Devon, the independence of the features is a matter which we know is very remarkable and originates from the enormously powerful action of the ancient ocean during the times of the subsiding and emergence of the land. On the other hand, we have features such as those of the Cotteswold Hills, not so very far off, in which the dependence of the features is capable of explanation by the character of the strata. For instance, in the case of the Cotteswold Hills, we have first the plain of Gloucester, and then it gradually rises in *this* way [*explaining on the blackboard*]. Beyond the escarpment of the Cotteswold Hills we have another plain, the upper plain being formed of Oolite limestone; the whole plain of Gloucester being formed of the Lias clay. So that the dependence of the escarpment of the Cotteswold Hills is clearly due to the superior hardness of this mass of limestone, which is about 250 feet and 300 feet in thickness, superimposed on the soft shales and other strata on which it rests. This limestone was originally covered over by newer strata to a height we do not know; but what remains of this table-land is the result of a horizontal denuding agency when exposed to the waves of the sea and subsequent subaërial erosion.

Then we have a second plain of marine denudation in this valley of the Severn and the plain of Gloucester, by which the strata of the Cotteswold Hills have been eroded back from their original margin. So in this case we have a repetition of the effect of the dependence of the conditions of the strata for their physical features and independence in such cases as those of Devon and Cornwall.

Now Dr. Jack does, I think, very clearly indicate the difference between denudation which produces a plain surface and denudation which produces valleys, and I have been endeavouring for many years to maintain that you cannot have a great plain of strata, more or less elevated, without bringing in the action of the ocean. On the other hand, the valleys, as everyone admits, are the result of the erosive action of running water. But there are geologists in the present day who will not admit that these islands were submerged

under the ocean at any recent period at all, and they refer all the escarpments and table-lands and plains to the agency of running water.

Lord Avebury, in his volume to which I have referred, and strongly recommend every one to read, goes very near holding the same opinions as myself; but he does not go quite so far, I think. He puts, perhaps, more stress on running water in forming escarpments than I am disposed to do; but at any rate we are very nearly in harmony on that subject.

Dr. Walker referred to the sea-stacks rising from the sea. Of course as we approach the coast of the British Isles from the outer ocean we can often, over the area formed by the Continental Platform, see these stacks. But sea-stacks and islands are really harder portions of the original strata which the sea had not had time to wash away. Ultimately, I suppose, the sea will level down most of the sea islands and sea-stacks that bound our coast; but it must be a matter of time.

Mr. Rouse and Colonel Alves referred to the existence of water in granite. I have examined under the microscope a good many sections of granite, principally from Ireland, and in almost all cases the silex or quartz of the granite was found to contain minute cavities filled with liquid. They are exceedingly small, and it is only in the quartz that these cavities occur, not in the felspar or in the mica. The explanation of this seems to be that the quartz is generally found to be non-crystalline in form. There is a crystalline structure (as it polarizes), but the form of crystal is not developed as in the case of mica and felspar; and the explanation is that the quartz was the last of the three minerals to consolidate. It had been kept in a pasty condition by the presence of water, and, no doubt, water containing carbonic acid, which must have been in a state of highly superheated steam at the time the granite was in the course of consolidation. Thus the crystals of mica and felspar had time to form and were embedded in this paste of quartz (with fluid cavities) which ultimately, as time went on, became solid.

That is the explanation I venture to offer for the remarkable phenomenon of the appearance of acid water in granite.

Dr. Jack put a question about the Logan Rock near Land's End. I have not myself been there, but the Logan Rock which is described by Wilkie Collins is a large monolith, so nicely balanced on its floor

as to be easily moved backwards and forwards. Some years ago a daring ship's-captain and his crew landed and displaced the block out of pure mischief, to the great indignation of the inhabitants, and the captain was obliged to replace the stone in its original position at his own expense, which was considerable.

I think, Mr. Chairman, I have now replied to the questions, as far as time and ability permit.

The Meeting then adjourned.

ORDINARY MEETING.*

GENERAL HALLIDAY, IN THE CHAIR,

who retired, before the discussion, in favour of

PROFESSOR ORCHARD.

The Minutes of the last Meeting were read and confirmed.

The following elections were announced :—

LIFE ASSOCIATE :—Rev. Ernest A. Wright, M.A., St. John's, Hull.

ASSOCIATES :—Mrs. Stovin, London ; Rev. Prebendary W. Covington, M.A., London ; William Harris Best, Esq., L.R.C.P., London.

NEW PRESIDENT.

The SECRETARY (Professor EDWARD HULL, LL.D.).—I have a very important announcement to make, and one that I feel sure will be gratifying to the Members and Associates of the Institute, as it has been to the Council, viz., that the Lord Chancellor, who was Vice-President for several years of the Institute, has accepted the office of President. I will read the Resolution that has just been passed by the Council, following a letter, dated the 23rd February, 1903, from the Archdeacon of London to the Secretary, stating the result of an interview with the Lord Chancellor as requested by the Council :—

"Resolved, that the Right Honourable The Earl of Halsbury, D.C.L., F.R.S., Lord Chancellor, be hereby elected President of the Victoria Institute, in succession to the late Professor Sir G. G. Stokes, Bart., and the Council assures his Lordship of its unfailing support, and of its high appreciation of the interest which, for several years past, he has shown in the welfare of the Institute."

* Monday, March 2nd, 1903.

The following Resolution electing David Howard, Esq., Vice-President, was also unanimously passed by the Council on the motion of Professor Lionel S. Beale and seconded by Captain Heath, R.N.:—

"Resolved, that David Howard, Esq., D.L., F.C.S., one of the Trustees, be elected Vice-President in the room of the Lord Chancellor, The Earl of Halsbury, who has accepted the position of President."

The thanks of the Council were passed to Archdeacon Sinclair for his services in the above matters.

A paper was then read, entitled :—

THE GLORIOUS REVELATION TOUCHING THE CREATION OF THE WORLD. By Cavaliere GUGLIEMO JERVIS, F.G.S., and member of the Italian Geological Society in Rome. Translated from the Italian by Mr. MARTIN L. ROUSE, by whom also it was read to the meeting.

The paper elicited a lively discussion.

On consideration by the Council it was decided not to print the paper in the *Journal of Transactions*, chiefly on the ground that it had already been printed and published in Italy, and was, therefore, not an original communication. Its object was to give a geological interpretation, of a very literal character, to the Genesis account of the Creation of the World and its inhabitants, and the summary of the author's conclusions may, perhaps, be best expressed in a passage from the preface to the paper, in which he says: "In the course of many long years devoted to the teaching of Science, the writer does not hesitate to affirm that he has not discovered that the study of Geology in the least degree conflicts with anything that the Author of every science revealed to man."

The paper in MS., together with the shorthand writer's report of the discussion which followed after the paper itself had been read, will be preserved in the office of the Institute for reference by any member who desires to consult it; and the Editor can only express his regret that he is unable to give it a wider circulation. The reader will find some interesting remarks by Chev. Jervis bearing on the subject of his paper in his letter addressed to the Secretary dated 26th April, 1902, in vol. xxxiv of the *Transactions*, p. 280.

E. H.

ORDINARY MEETING.*

DAVID HOWARD, ESQ., D.L. (VICE-PRESIDENT), IN THE CHAIR.

The Minutes of the previous Meeting were read and confirmed, and the following elections took place :—

MEMBER :—James Christie Reid, Esq., F.R.G.S., Chislehurst.

ASSOCIATE :—J. Martin Tilby, Esq., London.

THE WATER SUPPLY OF JERUSALEM. By ERNEST W. GURNEY MASTERMAN, Diploma in Public Health, Cambridge.

The SECRETARY (Professor EDWARD HULL).—As you may recollect when a paper was read on the water supply of Jerusalem,† by General Sir Charles Wilson, which gave very full details of the recent operations carried on by the Turkish Government for the supply of the city, he took great exception to the work because it did not fulfil its object, *i.e.*, of giving the people of Jerusalem a proper supply of water; and when a copy of the paper was sent to Dr. Gurney Masterman, who was out in Jerusalem professionally, he took exception to Sir Charles Wilson's views, stating that the supply was not unsatisfactory. This being so, as he was on the spot and Sir Charles Wilson was only writing from information that he had received, I thought it would be well to ask Dr. Masterman to state, in writing, his views on the subject, and in what

* Monday, March 16th, 1903.
† *Trans. Vict. Inst.*, vol. xxxiv, p. 11.

manner they differed from those of Sir Charles Wilson; and, of course, when his paper arrived, it had to be submitted to Sir Charles Wilson for his comments thereon. We have both these communications here and they will be read this evening.

The following communications were then read :—

JERUSALEM,
September 22, 1902.

To Professor Hull, F.R.S.

My dear Sir,

Thank you for your kindly note. When I first received your suggestion to write my all-too-late remarks, I more than hesitated. I decided not to do so, because I felt a criticism in one volume of a paper which had appeared in a previous volume would be of little interest. When, however, I came to talk over the subject of Sir Charles Wilson's paper with others here who had read it, I found that the views I have now written are those generally held, and there can be little doubt but that Sir Charles Wilson is mistaken.

As the work has now continued nearly a year, and if only *completed* (many parts of the pipes are even now not properly supported, and the greater part ought to be buried), I cannot see why it should not continue for long. I venture to send you a very amateur paper of mine which was published last February in an American magazine, as it may be of interest to Sir Charles Wilson's learned address. If you think what I have written of any use, then read it and print it, but if you feel it is of no use, discard it, or, if you will, cut it down—I may be unnecessarily prolix.

With kind regards,
I remain,
Sincerely yours,
ERNEST W. GURNEY MASTERMAN.

SIR CHARLES WILSON, in a learned and most interesting paper read before the Victoria Institute on May 26th, 1902, has described the water supply of Jerusalem, with a knowledge and authority which no one, I imagine, could rival. With the greater part of his paper it would be a liberty for me,

a mere amateur, to deal; with, however, that part which treats of the new supply inaugurated last year, it is clear to me, as it is too to many of those who know Sir Charles Wilson in this city, that he has been misinformed. I do not believe any unprejudiced resident here would characterise the new supply as having "ended in a fiasco," nor say that "the sum expended may be regarded as practically thrown away." Probably few of us are judges as to how much money should have been spent on the iron piping and other expenses connected with the new aqueduct. But residents here are rather concerned with the practical results, especially as the money has not come out of any of our pockets, nor have we been called upon to pay any water rate for the new supply; it is all a free gift, provided by certain charitable endowments connected with the city. When in England would a new water supply be given, even if a poor one, without the consumers suffering financially? Sir Charles Wilson considers the old aqueduct might, with much greater advantage, have been repaired. This may be, but we also know, he states it himself, that whenever this has been done, it has been wilfully broken. It may be repaired, but it cannot be protected either from malign treatment or from defilement on its route. The new aqueduct can; and is easily patrolled, long stretches being seen from the hills; and, what is more, it is far less easily injured by ignorant *fellahin*; and the water cannot be contaminated *en route*. There are one or two points, however, in which some local correspondent must have quite misinformed Sir Charles Wilson.

He states (1) "Feeble streams of water are delivered in the Haram esh-Sherîf, where it is only available for Moslems." "No attempt has been made to supply water to any quarter of the city." The "feeble streams" have so far been quite sufficient to keep the great reservoirs of the Haram replenished, so that all through this long dry summer water has been supplied gratis all over the city, the people only having to pay the cost of the water carriers, an item which has been considerably less than in previous years. This supply is independent of race or creed. Further, for many months past one of the old Arabic street fountains outside the Haram has been supplied with a pipe of running water, and the poor, Jews, Christians, or Moslems, can fill their tins, etc., as they like.

(2) "The water running by day through iron pipes exposed to the direct rays of the sun arrives in such a heated state as to be unfit for drinking." If Sir Charles Wilson's informant took a cup down at mid-day to the taps above the Birket es Sultan, and

tried a draught of water, then it is possible he may have been justified in his verdict; but as the people here do not rely only on that method of quenching their thirst, they do not complain of this. On very hot days the water, if taken in the heat of the day, is a little warm, but not nearly so much as might be expected. The great reservoir is not far from the city, and the water starts from that quite cold and runs rapidly. But there are two simple remedies applied to meet this: either to take the water at night, as some I know do, or cool it down in the houses. We in our house cool our water by letting closed bottles of it down into a cistern, when it comes out as cool as any one could wish; other people cool it in porous water bottles, but the water is at all times not only fit for drinking, but far superior to the water to which the people here have been accustomed.

May I in conclusion briefly enumerate the details of the great boon which in my opinion this new supply is to people here, especially to the poor, who form our great majority. We have had two exceedingly bad "wet seasons" and the country has seldom been more dry and parched; many springs have dried up, others are much diminished; it has therefore been a time when suffering in this city at this season, *i.e.*, at end of the dry summer, would ordinarily have been acute. After far better rainfalls I have seen great distress through the actual want of water for domestic purposes, and at such a time the drinking water used by the poor is filthy to a degree.

What has been the case this season?

(1) The water sold by the water carriers has been considerably cheaper, and has been of a far superior quality, being fresh spring water, instead of being cistern water of most doubtful quality—often from cisterns not cleaned for years, and containing all kinds of horrible filth; or the brackish water of Bîr Eyub.

(2) Among those who have time and patience it has been possible for any one to fetch water for nothing at all, either at the taps at the Birket es Sultan, or at the public fountain near the Haram.

(3) As good water has been more obtainable, the commoner water from doubtful cisterns has been freely used for watering the streets. Hence the greater part of the Jaffa road that has been incorporated into the town has been liberally watered night and morning, far more freely than in past years.

(4) For the more well-to-do it has been possible, without any charge except the cost of carriage, to have house cisterns re-filled

by means of water-carts, which carry the water from the supply at the Birket es Sultan to their houses.

(5) My daily life takes me among the sick belonging to the very poor inside the walls of Jerusalem, and my experience has been that while malaria and ophthalmia have been prevalent this summer, the diseases we ascribe to bad water, dysentery and typhoid, specially the former, have been less than usual; and as a medical man I have no hesitation in saying that the new supply has been greatly for the health of the community. To bring water from 'Ain Karem and other springs round Jerusalem at sixpence a small jar (such as is carried on a woman's head), or to send one's servant several miles for it, is a luxury only possible to those fairly well off. But all can now buy for about one penny a large tin of pure water from the springs of Solomon's Pools, and that has been made possible, at any rate for the present, by our iron-pipe aqueduct.

With Sir Charles Wilson's remarks of what *ought* to be done in the future, both with regard to construction of reservoirs on high ground, and even more urgently with regard to our most disgraceful drainage, I am most warmly in sympathy. Would that he were here with powers to carry out his reforms!

Reply by General Sir C. W. Wilson, K.C.M.G.

I have read Mr. Masterman's remarks on my paper, and have found nothing in them that would lead me to modify the opinion which I expressed, that the work recently executed in connection with the water supply is an engineering fiasco, and that the sum expended upon it has been practically thrown away. I certainly never intended to dispute the self-evident fact that a small supply of water is better than none at all. I can readily understand that residents in Jerusalem are thankful for small mercies, but this does not prove that a bad system is a good one.

The question from an engineering and financial point of view is a simple one. Water was conveyed from "Solomon's Pools" to Jerusalem by an ancient aqueduct which, in regard to design and construction, shows a high degree of engineering skill. This aqueduct, when in working order, brought a good stream of water to the Ḥarâm esh-Sherîf. It has been repaired several times, and could have been restored again *at small cost*; or it might have been replaced by earthenware or iron pipes. My experience in Turkey

would lead me to characterize the suggestion that a Turkish Governor could not protect such an aqueduct from injury when it was either his interest or desire to do so, as simple nonsense. What I said with regard to damage to the old aqueduct on previous occasions has been misunderstood.

Instead of utilizing the old conduit, the engineer entrusted with the improvement of the water supply, laid down iron pipes up hill and down dale *at great cost*, and delivered water at the same place with a *considerable loss of volume and pressure.* Surely in no other part of the world could such a fantastic scheme have been sanctioned, or have met, when carried out, with the approval not only of the municipal authorities, but of a gentleman who is unconnected with the local government. It is no excuse to say that the squandered money was taken from a charitable bequest and not from the pockets of the residents; and the fact that the Turkish Governor and the British Consul have been able to fill their cisterns, by having water carried up to them on donkeys, from the Birket es-Sultân, is no proof that the new system is a good one.

It is said that with the new works the water cannot be contaminated *en route*; but the aqueduct between "Solomon's Pools" and Bethlehem is open, and through the whole of that important section the water is exposed to contamination before it enters the iron pipes. The expression "feeble streams" in my paper is, as most readers would see, used in contrast to the strong stream that would have been obtained by the repair of the old aqueduct. I am glad to hear that one of the old fountains has been restored, but it would appear that many have still to purchase water from the Ḥarâm esh-Sherîf. Mr. Masterman, apparently, sees no objection to the delivery of warm water; but, in the name of common sense, why should Jerusalem be supplied with warm water when it could much more easily, and at far less cost, have been supplied with cold? What would be said in this country of an engineer who, at an exorbitant cost, supplied water to a town by means of iron pipes laid on the surface of the ground with the least possible regard to its inequalities? Why Mr. Masterman should attempt to defend an engineering blunder, which will long delay the construction of properly designed works, is a mystery. It almost makes one despair of any effort to improve the condition of Jerusalem.

C. W. W.

DISCUSSION.

The CHAIRMAN.—I do not know if anyone is here who can bring personal knowledge to bear. An engineering controversy is rather difficult for one who is not an expert to decide.

The chief thing which impresses one is the marvellous engineering skill of the old Jewish engineers, who could plan an aqueduct which fulfils so well its purpose, and it strikes me that we are not so superior, as we are apt to think, to those who have gone before us in these matters. The question now at issue is whether the arrangement was the best that could be done at the price, or whether it would not have been better to make another one. That is a very nice point for engineers.

Mr. MARTIN ROUSE.—I thought certainly they would have made another one, for several offers were made to them, first by the Baroness Burdett Coutts, and then Sir Henry Lechmere, and they were asked to carry it out; but the Turkish Government did not accept it, as appeared on several occasions, because the governors themselves were not to be the executors of the scheme.

We all know something of the principle on which the Turkish Pashas go to work, to secure as much as they can for themselves.

We read that they have an average rainfall of about 25 inches, whereas in London it is 27 inches, with a much less degree of sunshine, and therefore they must be surely in need of water in the hot season.

Mrs. FINN.—It so happens that it fell to my lot to repair this very aqueduct of which Sir Charles Wilson speaks. When I was living in Jerusalem I had the pleasure of helping in some operations in connection with Solomon's Gardens, where the tenure of the land was practically on condition that we kept that aqueduct in repair; and therefore from year to year I had to see that that small aqueduct from Solomon's Palace to the Temple in Jerusalem was kept in repair. The portion the Secretary alluded to between Bethlehem and Solomon's Pools is generally in excellent repair. It is just after it leaves Bethlehem that it is likely to be broken; but when we were all living there the Governor did twice think it worth while to repair it. Once in 1858 the then Governor put it into

complete repair, and we had the pleasure of taking Sir Moses Montefiore and Lady Montefiore to see the Temple area, and the Governor handed us, with pleasure, a cup of water from that aqueduct;—but it was broken afterwards, and left broken. But I think, with Sir Charles Wilson, that it could easily be kept in repair.

The SECRETARY.—Mr. Vice-President, ladies and gentlemen, I think, on the whole, we may satisfy ourselves that things are better now in the way of water supply in Jerusalem than they were when Mrs. Finn lived there, and when I passed through it in 1884. We had then to depend on one single supply for drinking water. That was a spring down at the foot of the wall in the valley of the Kedron, but now I think it is a great encouragement to those who contemplate, as I hope many people do, a visit to the shrine of Jerusalem (Christians as well as Jews), that they will now have an opportunity of drinking pure water. You may not be able to get such a supply as you have in London for your "Turkish bath," sponge, or English bath, but at any rate you get a supply of pure water, and you would be less liable to maladies from the water supply than you would have been a few years ago.

No doubt Sir Charles Wilson is perfectly right—that this reconstruction of the old aqueduct by some engineer, whose name I do not know, but who was employed by the Turkish Governor, did not carry out his work as it would have been done by an English engineer, or the English Government. But if it gives half the supply of pure water that was formerly delivered to the inhabitants, they may consider themselves fairly well off. I should only regret if, as Sir Charles Wilson seems to think, this infinitesimal improvement should have the result of delaying to a distant date a more complete reconstruction of the wonderful aqueduct and supply that was made in the time of Solomon from Solomon's Pools.

I do not think anyone has satisfactorily answered the question—Where does this water come from that supplies Solomon's Pools? It is really a most remarkable spot. There are two or three Pools, I think, Mrs. Finn?

Mrs. FINN.—Three pools, and they all have a different supply. They are not all supplied from one source.

The SECRETARY.—I thought they were all supplied from the head.

Mrs. FINN.—Not at all. The one that supplies the aqueduct does not supply the Pools at all.

The SECRETARY.—Then I am quite mistaken; but I suppose that those supplying the Pools issue from a fissure in the solid limestone rock. Of course the whole of that country is made up of beds of cretaceous limestone. You go down a few steps and come to an underground channel through which flows a stream of beautiful cold water into the uppermost of the three Pools. I thought that was the Pool that gave the supply to the aqueduct at Bethlehem.

Mrs. FINN.—The old fountain is at the corner of a steep place, and the water from that runs into Bethlehem and on to Jerusalem.

The SECRETARY.—I am glad of it, for I do not think the water coming out of the Pools would be pure; but it may have been very useful for irrigating the Gardens of Bethlehem.

Mrs. FINN.—They were evidently intended for an aqueduct for irrigation.

Mr. MARTIN ROUSE.—Are they used at the present day?

Mrs. FINN.—No. I was unfortunate enough to suffer very badly at one time. We were cultivating gardens there, and a Greek was ordered to destroy our work. Perhaps I may be allowed to say what I ought to have said before. It is not quite fair to lay all the blame on the Turkish Government. The Baroness Burdett Coutts did get leave to repair the old great aqueduct—not this one, but a much larger and finer one—and I am sorry to say that an Englishman told me in London how he was the means of stopping carrying out the scheme.

Mrs. Finn then narrated the occurrence that terminated so unfortunately for the inhabitants of Jerusalem.

The CHAIRMAN.—Really this paper has afforded us exceedingly interesting information. Anything that adds to our knowledge of Jerusalem, as it was and as it is, is always interesting. It is certainly one of the most pitiable spectacles there can be to see a country as badly governed as can be, with these miserable jealousies and these miserable under-currents of motive that have nothing to do with the benefit of humanity, and which are certainly spoiling one of the most beautiful parts of the earth. I often think when one reads that sort of question about the water supply of Jerusalem, how little we realize the advantages we have in England. We take it as a matter of course that we are to be supplied with water,

even though we waste most of what we get. In London the waste is inconçeivable. What becomes of the 36 gallons a day per head (babies included) I cannot conceive, but so it is. Contrast with that a state of affairs where water has to be fetched miles, and we ought then to be able to realize the advantages under which we live.

We owe our thanks to the Secretary for reading the papers, and we owe both the writers thanks for giving us two opposite views. I confess I am in sympathy with the original paper as to what would have been the right thing to do, if it were possible to have the old aqueduct repaired; but it is always interesting to hear the other side, even if one does not wholly agree with it.

The Meeting then terminated.

ORDINARY GENERAL MEETING.*

REV. CANON GIRDLESTONE, M.A., IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed.

The following elections were announced :—

MEMBER :—The Right Hon. the Earl of Ducie, D.L., F.R.S., 16, Portman Square, London.

ASSOCIATE :—Charles Little, Esq., Ontario.

The SECRETARY (Prof. EDWARD HULL, M.A., LL.D., etc.)—Letters of regret at not being able to attend have been received, including one from Bishop Welldon, who, I am sorry to say, has been very unwell.

The following paper was then read by the Author, entitled :—

MODERN THEORIES CONCERNING THE COMPOSITION OF HOLY SCRIPTURE. By Rev. JOHN TUCKWELL, M.R.A.S.

NO one conversant with the religious thought of our own and other Protestant countries during the last thirty or forty years, can have failed to observe that an attitude has been assumed by many minds in Christian circles towards Holy Scripture of an entirely different character from that which formerly prevailed. This is the more remarkable, since it is not due to any fresh light from modern scientific or other discoveries thrown upon the sacred page, but to the adoption of new theories formed to account for its composition. This change, however, although it has come about quietly and unobtrusively, is yet of the magnitude and importance of a revolution. To many it has brought with it as a logical consequence the rejection of some of the cardinal doctrines of Christianity, or a new interpretation of them scarcely distinguishable therefrom. A highly commended exponent of this "new theology" has declared that "it holds to the Trinity, though indifferent to the use of the word, but not to a formal and psychologically impossible Trinity (whatever that may mean); to the Incarnation not as a mere physical event, for that has entered into many religions,

* Monday, April 6th, 1903.

but as the entrance into the world, through a person, of a moulding and redeeming force in humanity ; . . . . to the Atonement as a divine act and process of ethical and practical import, not as a mystery of the distant heavens, and isolated from the struggle of the world, but as a comprehensible force in the actual redemption of the world from its evil ; to the Resurrection as covering the whole essential nature of man ; to judgment as involved in the development of a moral nature," and so on. Apart from the utterances of professional theologians, we find evidences of this change and its consequences in nearly all the religious literature of our times—hymns, prayers, sermons, magazine articles, popular religious and semi-religious novels and treatises of all kinds up to bulky Bible dictionaries. Richard Le Gallienne ten years ago, confounding things which differ, said, "The Trinity, the Atonement, Infant Baptism, Baptismal Regeneration, the Immortality of the Soul, the Life Hereafter—these and many other dogmas are now seen to be matters of symbolism or personal intuition" (*Religion of a Literary Man*).

That such a change should, whether rightly or wrongly, produce an impression among the non-religious classes, that an excess of reverence has been paid to Holy Scripture and an exaggerated authority over faith and conduct attributed to it, is no more than might be expected. But to what extent the general decline of the religious sentiment among the masses of our fellow-countrymen, indicated, apparently, by the decline of public worship and other symptoms, may be due to this change, is too wide and too delicate a question to be entered into here and now. That the two should synchronize gives reasonable ground for suspicion.

Among the religious classes also it is ominous that the leaders in the various denominations in England, America and Germany should complain loudly of the failure of the churches to accomplish their true mission, and should deplore with one consent the increasing dearth of candidates for the Christian ministry. The German correspondent of an English paper which has done more than any other in the country to promote this change, lately published a table showing that in the various universities of Germany, the number of theological students during the past twelve years had declined from 4,536 to 2,281.

When we view side by side with this change the enormous progress in the knowledge of truth, made during the same period in almost every other branch of research, we shall find ourselves confronted by a problem well fitted to provoke inquiry. And surely no Society could be more fitted to conduct it than one such as this, devoted to the investigation

of those great questions of Philosophy and Science which bear upon the great truths of Revealed Religion. By its leading and most capable advocates, this change, however, is alleged to be an integral part of the general intellectual progress of our race; so that without it the line of advance would be broken, and the Christian Church left in the rear, an enfeebled and neglected factor among the spiritual and intellectual forces of the age. But it must not be forgotten that whilst its advocates have appeared to hold the field and have certainly been eminently successful in obtaining the public ear, a more conservative party has continued to exist. For many years this party appeared to be indifferent to what was transpiring. It was thought possible that new light was breaking on the sacred page, and there was an unwillingness to obstruct it. But the party of change has, within recent years, reached certain conclusions which it regards as "assured." The epoch has been marked by the publication of such works as the *Encyclopedia Biblica* and parts of the *Polychrome Bible*. Although these publications indicate the high-water mark of the change, and do not meet with universal acceptance among its advocates, yet they serve admirably to show the direction of the movement and its probable ultimate objective. They may be taken therefore as indicating also, that the time has now come, when the two parties may wisely and fairly submit their differences to the tribunal of a more public religious opinion, with a view to their adjustment according to the indisputable sovereignty of truth.

In all ages, many thoughtful minds have felt serious difficulties of various kinds to an admission of the claim made for the volume of Holy Scripture as "the Book of God, and the god of books," or in other words, as possessing by its origin and contents a supernatural title to our regard. Hence everyone duly appreciating its worth, must most earnestly desire the removal of all such difficulties as are not from the nature of the case inevitable. It may help us, therefore, to a just perception of the balance of truth between the two sides, to sum up briefly a few of the difficulties which the party of change claims to have more or less successfully dealt with, *e.g.*:—

i. Alleged mistakes, scientific, historical, theological and literary, made by the sacred writers.

ii. Alleged irreconcileable contradictions within the different writings themselves, and between one writer and another.

iii. Apparent interpolations, glosses, etc., showing editorial manipulations of the writings, and destroying the claims to antiquity and unity of authorship made by the writings themselves, or made for them by the older school of expositors.

iv. High ideals of personal and national life alleged to be impossible to the Hebrew nation in the early stages of its history, calling for a rearrangement and redating of the records in order to a reconstruction of that history.

v. Advanced conceptions of the nature and attributes of the Deity which require to be accounted for, as the result of a long process of development and training, and which it is alleged cannot be reasonably assigned to the dawn of Hebrew national life.

vi. The claim to an extraordinary supernatural insight into the past, present and future, and into both the invisible and material worlds made by, or on behalf of, the sacred writers of both Testaments, which do not fall within the limits of the ordinary operations of human reason, and which by the adoption of new modes of critical exposition, need no longer be retained as an integral part of the Christian faith.

vii. The alleged incredibility of the present exact adjustment of character to life, miracle to doctrine, etc., presented by the New Testament records of the person and work of our Lord Jesus Christ, and the alleged unreasonableness of attributing the description of such a transcendent personality to writers in immediate and sympathetic contact with the effete and corrupt Judaism of His day.

viii. The miraculous and supernatural events and predictions recorded in both Testaments, and the miraculous and supernatural assistance claimed by and for the writers, in the production of the records.

ix. The exercise of supernatural spiritual power attributed to the Apostles and other early Christians in the practice and promulgation of the Christian life and faith, and the claim made by many professed Christians of the present day to an experience similar in many respects in kind, if not in degree.

These are some of the difficulties, or groups of difficulties, with which modern Biblical exegesis is required to deal, and

with which each party claims to be capable of dealing more adequately and more reasonably than the other. They are all recognized by the new school therefore, and the treatment of them more or less covered by the theories it has adopted to account for the composition of Holy Scripture. That investigations into these difficulties have been followed by many beneficial results need not be denied. Crude ideas have been matured; errors concerning matters of fact corrected; a more diligent search of the sacred records stimulated; the adoption of a more scientifically exact terminology promoted; while ignorant and erroneous exegetical interpretations have been abandoned. But admitting all this, there is still a wide and impassable gulf between the principles held and applied by the two parties even in their nearest approach to each other. A moment's review of these principles will make this plain.

THE MORE CONSERVATIVE VIEW.

According to what, in the absence of a better term, we may call the more conservative view, the volume of Holy Scripture is a collection of writings produced at intervals during a period of some 1400 or 1500 years under the influence of a supernatural, miraculous and divine inspiration. This inspiration is believed to have operated through the personality and the faculties of the several writers, but no one knows exactly how; and since the phenomenon appears to have ceased, its scientific investigation has become impossible. But its effects remain, and are chiefly these—the revelation of truths not otherwise attainable by the human understanding, such as the true nature of the Deity, His methods of dealing with sin, the mysteries of a future life, etc.; and an infallible guidance given to the writers in the selection of such historic or other facts as are best suited to serve the Divine purposes of the volume. It is contended moreover that as the very first condition of any communication coming from God must be its truthfulness, and that as the truth of this volume has in so many instances been established where verification has been possible, there is *primâ facie* reason for maintaining that this condition has been fulfilled. Of course it is recognized that these writings were originally produced by the hand; but that as the originals are lost, like the food and medicine provided by a Beneficent Providence for the welfare of our bodies, the continuance of the supply is dependent on human ingenuity and diligence, though often alas! through the

ignorance, carelessness or even wickedness of man at the cost of purity and wholesomeness. It is admitted therefore that no MS. of either Testament is faultless, and that as a consequence no version can safely be alleged to be absolutely accurate in every word. But there is reason to believe that the pains-taking labour of many scholars in this field of "textual" or "lower criticism" has given us texts so approximately accurate as to be absolutely trustworthy concerning every important and fundamental doctrine of the Christian faith. With regard to alleged errors and contradictions it is maintained that a sufficient number has been already corrected to justify the conclusion that others would be removed also, could an absolutely accurate text be obtained; while so many alleged scientific and historical mistakes have been found to lie, not in the Sacred Volume, but in the imperfection of human knowledge, that there is reason to believe that those which remain are of a similar nature.

According to this view also, whilst recognizing the obligation of an absolute loyalty to all objective truth, it is maintained that the truth of the fundamental doctrines of the Christian Faith generally, and of the Christian Scriptures in particular, has been established by nearly 2,000 years experience; for wherever they have gone they have elevated and blessed mankind to an extraordinary degree. But nothing has occurred nor been discovered in modern times to remove them from their position of pre-eminence, while all rival or contrary systems have hitherto proved so dynamically inferior, that unless falsehood be mightier than truth, the case of the latter against the former must be regarded as non-proven.

Similarly with regard to the objections raised against the high ideals of life; the advanced conceptions of the nature and attributes of the Deity; the knowledge disclosed by the sacred writers and speakers of things past, present and future, and of both worlds; the accuracy of the records concerning the person and work of Christ; and the presence of a Personal Spiritual Force among those who share the Christian faith and life; it is claimed that since all these difficulties relate to matters supernatural, they must be solved by reference to the supernatural, while the effort to eliminate the supernatural from the Christian Scriptures and from the faith and life to which they relate, if successful, would deprive them of all that gives to them their distinctive character and value.

Hence with regard to the date and authorship of the books of Scripture, where these are deduced from a plain and reasonable

interpretation of their contents, it is held that the abandonment of these deductions would involve in some cases the abandonment of all belief in the divine inspiration of the records, or the acceptance of a new and inadequate theory thereof; in other cases an imputation of untruthfulness to the writers; and in yet others an accusation of ignorance or intentional inaccuracy against Christ or His Apostles. As to the method of compilation, the practical unity of authorship is maintained where authorship is claimed, beginning with Moses as the author of the Pentateuch, and ending with St. John as the author of the Apocalypse. At the same time the existence of editorial additions and other interpolations of more or less value is not denied, nor that the authors in some cases made use of previous writings.

This statement, while intended to commit no one, will, it is believed, be found a generally accurate representation of the position. Moreover, it is believed to afford a stronger and more adequate foundation for dealing with those intellectual and moral difficulties which are alleged to keep many in the present day from an acceptance of the Christian faith than any other that has been proposed.

MODERN CRITICAL VIEWS.

Many professed Christian scholars, however, in the present day have objected to these views, and have deemed the basis they offer for dealing with modern doubt both unsatisfactory and ineffective. As the remainder of this paper must be devoted to an inquiry into the new method to which the old is asked to give way, it will be well to have, in a few brief sentences, the proposals which the new method makes to the old to attain the end in view. Here also, as in the foregoing statement, the non-commitment of those whose views it is believed to represent must be premised, and no intention must be supposed of attributing unanimity to them. Among the proposals made then are the following:—

i. To give up the traditional authorship of the books of Holy Scripture.
ii. To give up also the unity of their authorship and accept a theory of compilation instead.
iii. To give up their traditional dates and accept others more or less modern.
iv. To give up the belief in their special Divine inspiration and treat them as originating in the same way as

other human literature, or as the sacred books of other national religions.

v. To give up the history taught by these books as they now stand, and rearrange the events in a new order more in accordance with a progressive or evolutionary theory.

vi. To give up the belief in the strict truthfulness of the records and admit the influence of bias partisanship and pious inventiveness on the part of the writers.

vii. To give up belief in the miraculous so far as possible and treat all alleged miracles as legends.

viii. To give up belief in such explanations of Scripture doctrines and of the experiences of the devout, as are not verifiable by the more ordinary intelligence and experience of mankind.

ix. And some go so far as to ask that all belief in the operation of the supernatural, whether in the production of Holy Scripture or in the higher religious experience of the devout, should also be given up.

In urging these or portions of these requests, it is alleged that the older mode of dealing with the difficulties of the human mind placed needless obstacles in its way and created infidelity, while the new method will disarm the infidel and destroy his infidelity. To which it is objected that the new method is not a conquest but a capitulation.

It will thus be seen that widely divergent views of Scripture distinguish the two methods, and that the crux of the whole question between them lies mainly in the mode of its composition. If composed as the new method affirms, then, speaking generally, the Christian religion for nearly two thousand years was promulgated by false statements of its principles and enfeebled by false interpretations of its doctrines—erroneous modes of speech which eluded the intelligence and moral integrity not only of the great mass of its adherents but of most, if not all, of its most brilliant exponents, and yet in spite of which it achieved its most remarkable triumphs over the human understanding. It cannot but be therefore of the greatest interest to inquire for the origin of the discovery of these remarkable errors, the credit for which the new method takes to itself.

The time at our disposal is wholly insufficient to permit an adequate inquiry at first hand, we must be content therefore to accept the explanation given by one of its foremost and most capable exponents. Canon Cheyne, in his *Founders of Old*

Testament Criticism (p. 2), attributes it to English deism of the eighteenth century, which found so many apt disciples in Germany. "It was not merely," he says, "a new constructive stage of German theoretic theology and a keener psychological investigation for which deism helped to prepare the way, but also a great movement which has in our own day become in a strict literal sense, international, concerned with the literary and historical criticism of the Scriptures." This movement had as one of its earliest promoters in Germany Professor J. G. Eichhorn, of Jena and Göttingen (A.D. 1752–1827), who, as Canon Cheyne says, wrote in his *Introduction to the Old Testament*, "My greatest trouble I had to bestow on a hitherto unworked field—on the investigation of the inner nature of the several writings of the Old Testament with the help of the Higher Criticism"; upon which the Canon remarks, "By 'higher criticism' he means the analysis of a book into its earlier and its later elements." It is by this name, now more widely applied, that the modern development of this movement is best known, and if its ancestry be correctly represented, it may without disrespect be admitted that it will hardly be commended to devout English Christians by its connection with the notorious deists Shaftesbury and Bolingbroke, Collins and Toland, Woolston and Tom Paine.

Let us, however, overlook as far as possible any discredit which it may derive from its unfortunate ancestry—nothing and nobody can be held responsible for his ancestry—and pass on to consider some of its leading principles.

I. The Principle of Composite Authorship.

Eichhorn's work may be said to have started with an endeavour to account for the Book of Genesis upon this principle. He supposed it to consist mainly of two authors, one of whom has been termed the "Jehovistic" and the other the "Elohistic." But the theory did not originate with Eichhorn. Some fifty years earlier Jean Astruc, a French physician, had noticed that although the Book of Genesis relates throughout to events which transpired before the Divine name in its full form of "Jehovah" had been assigned to the use of the Israelites through Moses (Exodus vi, 3), yet both that name and "Elohim" appear in the said Book. Jean Astruc therefore published a volume in 1753 A.D. entitled *Conjectures sur les mémoires Originaux dont il paroit que Moyse s'est servit pour composer le livre de la Genèse.* But the *conjectures* of Jean Astruc have become the "assured conclusions" of the higher

criticism of to-day. The theory thus started however was not confined to the Book of Genesis; it was applied by Eichhorn to the rest of the Pentateuch, and has since been extended to the whole volume of Scripture from Genesis to Revelation. Hence, *e.g.*, the Book of Genesis is said not to have assumed its present form until the time of the Exile, say 500 B.C., and to have been put together by a series of "Rédacteurs" or "Editors." The first of these is supposed to have become possessed in some unknown way of the writings of the unknown "Jehovistic" and "Elohistic" authors, "J" and "E," and to have combined them into another document "J E." Then it is supposed that a priest wrote an independent narrative "P" upon which a second editor fitted "J E" and added his own editorial "adjustments" and so on. We thus have no less than five writers to deal with in the Book of Genesis alone. The Book of Exodus is assumed to have originated in much the same way, and the priest is supposed to show his hand by a jealousy for his class in those parts which make Aaron co-operate with Moses before Pharaoh while "J" represents Moses as acting alone. But Chapters xx, 23—xxiii, 33, are without any apparent reason separated from the rest of the Book and called "The Book of the Covenant." The Book of Leviticus is assumed to be throughout part of a so-called "Priest's Code." But Chapters xvii–xxvi are for some unknown reasons separated from the rest of the Book and called the "Law of Holiness" ("H"). Where "P" obtained it the critics do not know. The Book of Numbers is treated in the same way. The Book of Deuteronomy has a still less credible origin assigned to it. It is represented as written in the days of Josiah, secreted in the temple, and then said to have been "found" by Hilkiah the priest (see 2 Kings xxii and 2 Chronicles xxxiv), notwithstanding the statement that it was "the Law of the Lord by Moses" (see Canon Driver's *Introduction*). For this new version of the story or for limiting the "find" to the Book of Deuteronomy there is not the least historic foundation, nor for the further arbitrary restriction of the term "Book of the Law" to Chapters xii—xxvi.

It would be impossible in this brief paper to trace out the results of the application of this theory to the rest of Scripture. It must suffice to say that upon the same principle as Moses is got rid of from the authorship of the Pentateuch and a series of capital letters obtained in his place—"J," "E," "J E," "P," "H," "D," "D^1," "D^2," "D^3," etc., so Joshua, Samuel, David, Solomon, Isaiah, Daniel, the Evangelists and Apostles, and even our Lord

Himself fade almost entirely out of the remainder, leaving us in their places a series of unknown editors piecing together with innumerable blunders and contradictions fragments of hitherto unheard-of writings of an indefinite multitude of nameless authors.

Moreover the carelessness with which these compilations were made leaves no room for inspiration, and would bring a well-merited castigation upon the proverbial school-boy. For instance, Prof. Geo. Adam Smith, in his *Modern Criticism and the Teaching of the Old Testament*, in dealing with what are called "doublets," and which are supposed to afford evidence of the compilation theory, cites the Book of Joshua. He says, "In the story of the crossing of the Jordan as told in Josh. iii and iv, there are two accounts of the monument set up to commemorate the passage. One of them builds it at Gilgal on the west bank with stones taken from the river-bed by the people; the other builds it in the bed of the river with twelve stones set there by Joshua." It is difficult to believe that Prof. G. A. Smith could have read the story through when he wrote these words. Let us take two verses—"And the children of Israel did so as Joshua commanded them, and took up twelve stones out of the midst of Jordan, as the Lord spake unto Joshua, according to the number of the tribes of the children of Israel, and carried them over with them unto the place where they lodged, and laid them down there. And Joshua set up twelve stones in the midst of Jordan in the place where the feet of the priests which bare the ark of the covenant stood; and they are there unto this day" (iv, 8 and 9). Comment is needless. Again, in the account of the capture of Jericho he says that two stories have been interwoven: "One which relates how Israel marched round Jericho on seven successive days," and another which relates: "That a portion of the armed men marched round the city seven times on the same day." Now it would be surprising enough to find that any ordinary reader could have failed to see that the narrative is a perfectly consistent account of a military demonstration which took place once on six successive days and was repeated seven times on the seventh day. But it is still more surprising to find a Biblical critic and a professional theologian, ready to convict a man with intelligence enough to compile the Book of Joshua, of being such a stupid blunderer as to piece together in this careless way fragments mutually contradictory of each other. But it is most surprising of all that it should have taken intelligent readers more than two thousand years to find out the blunders.

It has been commonly supposed that these "results" are due to a more exact knowledge of the Hebrew than the ordinary English reader possesses. But such is not the case. Indeed, a critical examination of the Hebrew gives "results" quite opposed to these. For instance, the Hebrew of Ezra, Nehemiah and Daniel—the time of the Exile—abounds with Aramaisms, but the Hebrew of the Pentateuch is the purest in almost the whole volume of the Old Testament, and does not contain a single chapter which could on these grounds be assigned to the same period as the Exilic Books. With regard to the New Testament, the personality of the Evangelists, and with it their personal testimony, almost disappear. The original source is supposed to be, in some cases, certain undiscovered and possibly imaginary *logia*, or the first and third Evangelists are supposed to have copied from the second. Thus in the Gospel of St. Matthew 816 verses out of the total of 1,068 are supposed to have been taken from St. Mark, or from the same original source, while of St. Luke's 1,149 verses, 798 are said to have been derived from the same source, and this in spite of the fact that St. Luke himself absolutely disavows—if words have any meaning at all—having made use of any such sources (i, 1–3).

All this is very remarkable, and the astuteness claimed by means of which these supposed different documents are discriminated is an unprecedented phenomenon of the human intellect. Hence when the scissors are passed between the ו and the י of the word וַיְהִי (Genesis xxii, 20), and Professor W. H. Bennett professes to have detected the junctions of nineteen different scraps or snippets on one page of the Polychrome Bible, we begin to wonder whether the length of rope claimed has not resulted in the proverbial suicide of the principle. It is necessary to remember also that although these various documents are spoken of with as much confidence as though they lay side by side snug and safe in the British Museum, not one of them has ever been found, nor the least fragment of one, nor the remotest allusion to one among all the known writings of antiquity, nor was their existence ever conceived of by the human mind until their invention became necessary by this theory of composite authorship.

As to the manner in which these imaginary documents are used by modern criticism, let us hear a whilom expert. "Such theories," says Professor Ramsay in *St. Paul the Traveller*, "usually assign varying degrees of accuracy to the different older documents; all statements which suit the critic's own views on early Church history are taken from an original

document of the highest character; those which he likes less belong to a less trustworthy document, and those which are absolutely inconsistent with his views are the work of the ignorant botcher who constructed the book. But this way of judging, common as it is, assumes the truth of the critic's own theory, and decides on the authenticity of ancient documents according to their agreement with that theory."

Enough has been said to explain this theory of composite authorship, and, it is hoped, without the least desire to display any other partiality than a partiality for truth. There is, however, one fact which ought not to be passed over. It has been possible in one solitary instance to test it. We have in addition to the Biblical story of the Deluge, the Assyro-Babylonian account, current with the parent stock of the Israelites for nearly two thousand years at least, and perhaps for much more, before the time, when according to these theories, the story assumed its present form. The same so-called elements, marked "J" and "E," are as distinctly discoverable in the one as in the other, and in almost the same order. Thus in both, the instruction to build the ark or ship (E) precedes the collection of the cargo (J); the entry into the ark or ship (E) and the story of the storm (E) are followed by the account of the destruction of life (J); the abating of the storm (J) by the resting of the ark or ship upon the mountain (E) and the sending out of the birds (J); the quitting of the ark or ship (E) by the presentation of the offerings (J) and the oath or covenant (E).* It is therefore not too much to say that a theory which is not inductive but purely *à priori*, and which breaks down upon the first possible test, ought not to be accepted as a "scientific" explanation of so unique and mysterious a problem as that of the composition of Holy Scripture.

II. The Principle of Historic Progress.

Another principle relied upon is that of historic progress. The problem to be solved by this principle, is the plain fact that Holy Scripture does beyond denial appear to present us with a precise and literal record of events which it treats as genuine history, during the period from the Creation to the close of the Apostolic Age. It uses in many places symbolic

* For a more detailed table of the parallelism see the author's little book, *A Plea for the Old Faith* (Stockwell). The professed dissection of the Biblical Story is taken from Driver's *Introduction*.

and figurative language, but never appears to betray the least recognition of any detailed use of myth, legend or fable. The story of the world before man; the creation of man himself; his rebellion against his Maker; the corruption of the antediluvian world; the Deluge; the re-populating of the earth; the rise of the great nations of antiquity; and the history of the Israelitish naticns, whatever forms of speech are used, are all treated as matters of historic fact.

But the human mind is supposed to stumble at some of these things, and so it has been offered relief on the principle of historic progress.

First with regard to the pre-Israelite world. It is premised that since history and the exact description of scientific facts are comparatively modern developments of literary ingenuity, these records may all be treated as legendary. But fortunately it has been possible to test this negation at more than one point. The remarkable progress of modern science has enabled us to see that Genesis i, is, allowing for certain verbal formulæ, an exact orderly and precise account of the creation of the world from its gaseous condition to the close of the Quaternary period. Or again, tested by modern geological research, the Deluge is found to have been a fact and not a fable.

Then with regard to the later records mainly concerned with the history of the two Israelitish nations and the founding of the Christian faith, no unbiassed reader can deny that from Abraham down to the seer of Patmos the Scripture does profess to give us exact history. The story of the Patriarchs; the deliverance of the Israelites from Egypt; their settlement in the land of Canaan; their national histories; the ministries of their prophets; the personalities of their great men—Saul, David, Solomon and Hezekiah; Isaiah, Jeremiah, Hosea and even Jonah and Daniel, are treated as strictly historic. Even the New Testament writers and speakers never betray the least suspicion that their supposed ancestors were mythical "eponymous heroes" or the records concerning them, legends or fables.

Why these records should not continue to be read as historic in the absence of any inexorable evidence from newly discovered truth it is not easy to see. But for those unable to do so it has been premised on the principle of historic progress that the Hebrew nation could not possibly have started its national existence in the way described. It is premised that originally they must have been only a small obscure nomadic tribe highly susceptible to the superstitions supposed to be begotten of a

desert life, having only the crudest religious ideas, and these of a polytheistic order, and probably practising the horrid rite of human sacrifice. Thus Abraham, Isaac and Jacob if not Canaanitish heroes engrafted at a later period on the Hebrew stock, are not to be viewed in the light of the glorified descriptions of the Book of Genesis, for was not that book on the composite document theory compiled some 1,000 or 1,500 years after their shadowy personalities had slept with their fathers? Moreover, since upon this principle it is impossible that the Hebrew nation, however extraordinary, should have started upon its free national existence with such a constitution as that of the so-called Mosaic Legislation—therefore the bondage in Egypt; the mission of Moses to Pharaoh; the passage of the Red Sea; the giving of the Law at Sinai; the journey through the wilderness; and the conquest of Canaan, are not to be regarded as the accurate accounts of sober history. Much of the professed history of the kings must on the same principle be similarly treated, and we are even warned that David himself, the man after God's own heart, the "sweet singer of Israel," and the alleged ancestor of our Lord, being described as of "a ruddy countenance," may turn out after all to be only "a solar myth." As to the prophecies of Scripture they are for the most part pre-dated history, or where this theory will not work, as in the case of the prophecies of Isaiah, we must suppose two Isaiahs or whatever larger number may be necessary, while with regard to the exilic stories of Esther and Daniel, Esther was a sort of "Fairy Queen," and Daniel was not—there was no Daniel and no den of lions, and no Shadrach, Meshach and Abednego, and no fiery furnace, and no "Form of the Fourth like unto the Son of God," causing the proud king in humble and penitential tones to exclaim, "Ye servants of the Most High God, come forth and come hither." If it be objected that in the New Testament the writers and speakers treat the records of all these events and persons as historic, we are told by one learned divine at least, and he the principal of a theological college in London, that even with regard to our Lord, "historically we know more of the Old Testament than He did"!

To establish these premisses then it was deemed necessary to reconstruct the history. But how to do this without rejecting or destroying the records was a difficulty. The new theories, however, have accomplished the task. Eduard Reuss (1804–1891 A.D.) declares that the solution came to him rather as an intuition than as a logical conclusion, and it was this—"that the prophets are earlier than the Law and the Psalms later

than both." No doubt theories of the greatest value may flash upon a thoughtful mind with great suddenness. But the next thing the scientifically trained will do is to ascertain whether the facts are as the theory supposes. This, however, Reuss does not appear to have done, but instead thereof to have immediately turned the Old Testament records topsy-turvy. He assumed that the elaboration of a nation's laws must, of necessity, be the result of long experience; and that the higher the moral level of those laws the longer the period required for the nation to rise to it. But he did not take the pains to inquire whether, even if the rule be admitted, exceptional conditions may not have existed in Israel's case undetected by his intuition. Had he done so he would no doubt have been led to very different conclusions. Now since this is the "working hypothesis" of the principle of historic progress, it may be well to submit it to a brief examination.

First of all. Is it true that an advanced code of laws necessarily presupposes a long period of previous national history working up to it? Had Reuss investigated this question he would have found reason to doubt the universality of the hypothesis. He would have found that it is never true of Colonial nations. Turning his eyes westward he would have seen two great nations, the Canadian and the American, with an advanced code of laws of a high moral level with yet a very brief national history. Or among the nations of antiquity he would have found Assyria, one of Israel's contemporaries, upon a level with Babylonia the mother country of both. It is quite true that comparatively little was known of the history of Babylonia and Assyria when Reuss formed his hypothesis, but enough was known to have kept even him from the errors into which he fell, and more than enough is now known to check his followers from the adoption of his fallacious intuition and from persisting in his erroneous conclusions.

Moreover, the Scripture history of Israel is perfectly consistent with itself, and does not need reconstructing. Abraham is not represented as a rude and savage sheik nurtured in the wild life of the desert, the progenitor of a tribe of wild nomads wandering into Egypt, captured, enslaved, breaking forth a horde of semi-savages, and adopting a constitution of a highly moral and religious tone. On the contrary it represents him as a devout citizen of a great and ancient city, of whom the Almighty said, "For I know him that he will command his children and his household after him," a man therefore who could not but have carried forth with him and transmitted to

his posterity the very best elements of the civilization and culture in which he himself had been brought up. How true this is which the Scripture records quietly take for granted as a thing not needing to be said, the recently recovered laws of Khammurabi, the contemporary of Abraham, and many other modern discoveries amply testify. In Egypt also both the people and their leaders were brought into contact with one of the greatest and foremost nations of antiquity. A shipload of English people going to America or Australia do not need to revert to an imaginary prehistoric savagery before they establish a national constitution; why then should it be thought necessary to doubt the veracity of a record which does not assert that an offshoot from Babylonia did so? And why should it be thought necessary to conciliate an irrational unbelief by breaking up the Scripture records into inexplicable fragments and rearranging them in an incredible order?

Next we may be permitted to inquire whether such indubitable facts as are known to us and a legitimate use of the Scripture records themselves will bear out this hypothesis. In spite of Professor Delitsch's lecture on *Babel und Bibel*, no Assyriologist in the world has yet been able to disprove that the historical records of Holy Scripture have received great and remarkable confirmation from the recent discoveries of archæology. If this be not so let us be told categorically the historic errors which archæology has discovered. Babel, Erech, Accad and Calneh, the cities over which even Nimrod ruled; Asshur, Nineveh and Kalah the first cities of Assyria; Karchemish, the great Hittite capital, and other cities without number are all found in the very localities indicated by the Biblical records, while historic events almost innumerable connected with other nations contemporary with the Hebrews, with their chief promoters and actors, are directly or indirectly confirmed. Thanks to Dr. Pinches, Chedorlaomer, Arioch, and Tidal have started up out of the buried records of the past, while Sennacherib and Hezekiah, Mesha and Ahab, Sargon and Merodach-Baladan, Shalmaneser and Jehu, "the noble Asnapper," and Artaxerxes, Nebuchadnezzar and Cyrus, possess the same features, speak in the same tones, and display the same characters in the records of archæology as they do upon the pages of Holy Scripture. No more striking instance of the careless theorizing on the basis of this principle of historic progression could perhaps be found than that afforded by the moderate and temperate Canon Driver.

In his commentary on the Book of Daniel—that last refuge of the Higher Criticism—in the *Cambridge Bible* as well as in his *Introduction*, referring to the old musical instrument controversy he says: "Anyone who has studied Greek history knows what the condition of the Greek world was in the sixth century B.C., and is aware that the arts and inventions of civilized life streamed then into Greece from the East, not from Greece eastwards." Now I venture to say that no one who has studied Greek history "is aware" of anything of the kind. Our histories of Greece tell us that "the sixth century B.C." was "the most brilliant in the history of Greece." It was the age in which Crœsus, the famous King of Lydia in Asia Minor, adopted the Greek language and customs, and Greek sages swarmed "from Greece eastwards" to his Court; it was the age of the building of the first temple of Diana of the Ephesians, reckoned one of the wonders of the world; it was the age of the philosophers Thales, Anaximander, and Pythagoras; it was the age of the poets Sappho, Alcæus, and Anacreon; it was the age of the legislators Solon and Pisistratus. Moreover, it was also one of the most brilliant ages in the history of Babylon. The statement, therefore, that in such an age, one of the most brilliant in her history, Greece had no "arts and inventions of civilized life" to give to Babylon in the East, in one of the most brilliant of hers, displays an obliquity of vision in the application of this historical hypothesis as extraordinary as that of his predecessor Reuss himself.

Such facts as we know therefore forbid us to suppose that these records, compiled with such precise geographical and historic knowledge, and covering a period of more than a thousand years, could have been hacked out of the records of unknown writers by mere botchers and trimmers, and patched together in the bias of pride or partisanship.

Finally we may be permitted to ask whether the chief actors in this reconstructed history could by any moral possibility have taken the places assigned to them by this hypothesis. It is quite true, as the late Dean Farrar pointed out, that we miss in the historic records of Kings and Chronicles any definite account of the observance of the Day of Atonement and of the Jubilee Laws. But it must be remembered that for several hundred years after the death of Moses the disorganized state of the nation made the maintenance of these institutions practically impossible. It was struggling for its life and in constant and deadly conflict with powerful and treacherous

foes. Then under the monarchy the schism soon came, and a series of unfaithful kings and priests caused in both nations so serious a lapse into idolatry as ultimately brought both down to irreparable ruin. It was during this latter period for the most part that the ministry of the prophets took place.

Now if the prophets preceded the Law, not only must we abandon all faith in the veracity of the records which describe the giving of the Law, but we must assign to the prophets themselves a *rôle* which honest men of God could never have taken. They were chiefly of the non-sacerdotal classes, and their missions were largely to rebuke both kings and priests and people for their unfaithfulness to the Divine Laws—Laws which with one voice they attribute to Moses. They call for a return to the loyal obedience of those Laws, and utter solemn threats of national disaster and final ruin if disobedience be persisted in. "The ox knoweth his owner and the ass his master's crib," said Isaiah, "but Israel doth not know, and my people doth not consider." Ezekiel the prophet of the Exile, says in the name of the Lord, "Wherefore I caused them to go forth out of the land of Egypt and brought them into the wilderness. And I gave them my statutes and showed them my judgments, which if a man do he shall even live in them. . . . But the house of Israel rebelled against me in the wilderness; they walked not in my statutes, and they despised my judgments . . . then I said I would pour out my fury upon them in the wilderness to consume them" (xx, 10–12). Now if the hypothesis under consideration be correct, there is not a word of truth in this statement, and we must conclude that such language was mere prophetic chicanery, rulers and people being rebuked for disobedience to Laws which had never been given, and browbeaten into the observance of Laws which had yet to be enacted.

On the whole then it must be concluded that the hypothesis for the reconstruction of Old Testament history which places the prophets before the Law, and treats the earlier records as legends, creates more difficulties than it removes, and makes larger demands upon our credulity than the most miraculous event recorded upon the sacred page.

III. The Theory of Spiritual Evolution.

No account of these modern theories could be regarded as approximately adequate which passed over the theory of spiritual evolution. The facts dealt with are briefly these:—Upon the earlier pages of the Sacred Volume the religious

truths recorded are more dimly perceived and described than upon its later, while the general moral and spiritual level of the subjects of their influence is considerably lower. Moreover even at the middle period of the history some of the characters most approved and most exemplary in their devoutness shock our moral sensibility by the enormity of their words and deeds. To account then for the upward movement of truth and life which appeared to take place, the theory of evolution is introduced into these spiritual spheres.

It is not always easy to discover whether the term is intended merely to indicate an amplification of truth and life analogous to the evolution of the individual from the germ; or whether it is used in the far more difficult sense of the origination of a higher species from a lower. Probably some attach one idea to it and others the other. But in whichever sense employed it is beyond doubt intended to displace the idea of a divine inspiration communicated to the writer *ab extra*, or from a source not himself, and then operating within him through his mental and moral faculties. Nor do those writers who resort to the theory always make it plain whether the process is supposed to apply to the *events* recorded or to the *record* of the events, or to the *truths* intended to be conveyed by the record, or even to *Him* to whom legislators and historians, poets and prophets, apostles and evangelists, all alike bear witness. But to whichever applied, it seems in every case to be equally inappropriate. Broadly and generally, the term evolution indicates that the living power which produces new forms is within, and operates within the original, under the favourable conditions of a suitable environment. Manifestly, therefore, to use it to indicate that one set of *events* followed another, as shall we say, that the forty years of wandering in the wilderness came by a process of evolution from the false report of the spies, is to use it without any due appreciation of the proper function of words. May it then be applied to the *record*? This surely would land us in absurdities equivalent to that of saying that Macaulay's *History of England* was followed by that of Froude by a process of evolution. Or if it be applied to the *truths* intended to be taught, the term is no less scientifically inadmissible, since the truths themselves at the end of the period covered by the record were neither more nor less than at the beginning. They had not altered. The alteration and progress was in human knowledge and experience, and by no conceivable application of the term can the advance of human knowledge and experience be

described as evolution. But worst of all is that use of it which describes Christianity as the last result in an evolutionary process from the earliest forms of religious faith of the Old Testament Scriptures or elsewhere. Christianity is the Personal Christ in the active exercise among men of His supernatural and divine grace. Unless, therefore, His miraculous conception, His virgin birth, and His divine nature be denied, we must accept His own declaration of His pre-existence—"I came forth from the Father and am come into the *kosmos*, again I leave the *kosmos* and go unto the Father," and we must therefore frankly confess as utterly inadmissible the term "evolution."

But in every employment of the term and in whatever sense used, it appears to contemplate a degree of religious ignorance in the earlier period of our race which did not exist and a measure of progress therefore which could not have taken place. That the religious knowledge conveyed to the mind of man by the New Testament is in advance of that conveyed by the Old is no new discovery. But there is no truth in the New which may not also be found in the Old. Moreover we are almost daily being forced to the conclusion that the amount of religious knowledge in the very earliest ages of mankind of which we have any record was far greater than a few years ago had ever been supposed. It would seem therefore not improbable that the Scriptures of the Old Testament especially were given for the preservation of truth as well as for its revelation.

What shall we say to such admonitions as these current probably among Abraham's contemporaries and related as uttered to mankind by its Creator:—

> "Every day will thy God be gracious to thee;
> Sacrifice, prayer, the best of incense,
> For God, in purity of heart shalt thou have—
> That is the delight of the Divinity.
> Prayer, supplication, and bowing down the face,
> Early shalt thou offer Him.
>
> . . . .
>
> Sacrifice increaseth life,
> And prayer releaseth thee from sin.
>
> . . . .
>
> Against friend and companion speak no evil,
> Speak not low things, do right,
> If thou promise then give, withhold not." *

Surely if such precepts as these were in circulation in the

* See *The Old Testament in the Light of the Historical Records, etc.*, by T. G. Pinches, LL.D., M.R.A.S.. (S.P.C.K.)

nation from which Abraham came and long before his time, there was not much room, especially on the ethical side of human life, for the operation of any principle of evolution from the days of the patriarch at least until He came in whose name the new dispensation was founded.

From these principles applied by modern criticism to account for the composition of Holy Scripture, it is evident that throughout the supernatural is being lost sight of. But every system of religion offered to the acceptance of man hitherto, has been offered with a view to his safe guidance into the supernatural and eternal life of the future. How this can be done by a religious system shorn of its supernatural origin and stripped of its supernatural power not even the most brilliant exponent of the Higher Criticism has yet explained. We wait to know.

DISCUSSION.

The CHAIRMAN.—I am sure I may thank Mr. Tuckwell in all your names for his most lucid account of the conflict that is now going on amongst us, in which we are all more personally interested than we sometimes think, because the literary side of Christianity is a very important one. God has chosen, in His providence, to give us a literary side to it. It might have been otherwise. The whole of Truth might have been confined to tradition, but it is not so, for as Mr. Tuckwell says, in one of his later pages, "It would seem, therefore, not improbable that the Scriptures of the Old Testament especially were given for the preservation of truth as well as for its revelation." We owe a great deal to that. Perhaps Mr. Tuckwell's paper has the effect, rather, of destroying the destroyer. My own personal aim is to be constructive rather than destructive. I have thought it might be well for us to consider what is the best method of dealing with this great subject for practical purposes. It seems to me that the first thing is to assure ourselves of the historic Christ, to stand firmly on His work and mission, and to make sure of the New Testament before dealing with the abstruse subjects of the Old Testament.

But when you have the historic Christ, you find yourself in possession of the Old Testament, which was always recognized by Christ and His followers as the basis of their mission, and you cannot avoid it. Thus you are compelled, as soon as you have accepted Christ, to push back your inquiry into the books that precede our Lord's time, and you soon find yourself back in the age of Nehemiah, about 400 years B.C., the age in which the Old Testament drew near to its conclusion and completeness; and about the books so completed Josephus says, that all the writings are the work of prophets, and there are none after the age of Artaxerxes. You next start back from Nehemiah and push your investigation up to the age of Moses, or Abraham. But you have this difficulty, that you have no contemporary literature before Nehemiah, so that you are cut off from the natural materials for discussing your subject.

What have you got, then? you have got the books themselves—those wonderful books of the Old Testament. You speedily find that they are of different kinds and materials in many ways. They are not isolated, and it is in this way that you work back from the age of Nehemiah to Moses. Take Ezra and Nehemiah, what books did they possess? You find they had, to a large extent, the books that compose the Old Testament. Then you go back to the days of David's Bible again, and to the days of Joshua, and you ask, was there a pre-Joshua Bible? And you find there was. Moreover the whole of the Exodus was carried out by God because of certain promises made to man which constituted his *Magna Charta*. And so you find your way back to Genesis, and if you believe in what Christ believed you believe in the mission of Moses, and when you use your own Bible you have a strong literary argument upon which you can rely.

The third argument is archæological. The German Emperor has rushed into the conflict where professors might fear to tread, perhaps, but I would recommend you to invest sixpence in a little book just published by the Christian Knowledge Society entitled *Babylonian Excavations and Early Bible History*, by Professor Kittel, of Leipzic. It is a good thing if you can correct one German professor by another, and it is curious that Dr. Kittel discusses nearly all the points that Mr. Tuckwell has gone into. In this matter there appears to be an Anglo-German Alliance for truth. But I will not

say more upon the archæological test, because I see some here who are experts in the matter, except this, that people say, "Is it really thought that Genesis is Babylonian"? I say yes, of course it is, for Abraham came from that part of the world.

But I will pass to another topic which is hardly ever touched on. Mr. Tuckwell touched on it on one page, viz., the linguistic side. So little is said about the linguistic side of this matter. Any student would naturally expect that the oldest part of the Old Testament would show marks of its age, and that the later part would show marks that it is later. I have devoted a great deal of my spare time to this particular question, investigating the linguistic side of the subject, and I have found, almost to my surprise, and to my intense satisfaction, a very strong linguistic evolution, as I will call it for convenience, running from Genesis onwards, so that you have a number of non-technical words there, which are afterwards dropped out, and another series of words rising up in the days of the Kings, and a still further series in the days of the Captivity. Just let me give you, for a moment or two, one or two instances. It is often thought remarkable that "clean" and "unclean" beasts should have been referred to so long ago as the days of the Deluge. What did they know about clean and unclean beasts? The curious thing is that when you examine your text carefully you find that expression "unclean" is not used, but the non-technical expression "not clean."

Again, how remarkable it is that the month *Abib*, the month of the Passover, is so called in Exodus, but it drops out in the later books, and the name *Nisan* is substituted for it. *Abib* is an Egyptian word and therefore is in its place in Exodus, but it drops out afterwards because the people got to Assyrianize their words more.

Another instance is the shewbread used in Exodus and other books. You can trace the word up to the time of David, and from that time onwards it is totally different. The word is in the Bible, although, unfortunately, our revisers have not noticed the change. They ought to have put *Shewbread* in the one case and *Rowbread* in the other.

I hope the days will come when our critics will spend more time in studying what the words mean than in substituting their own ideas. I feel sure that the paper that has been read will be a great

encouragement, and that you will feel you are not following "cunningly devised fables" when you believe the Old Testament.

Mr. MARTIN ROUSE.—The manly and interesting sketch that Canon Girdlestone has just given bears out, in a remarkable manner, an observation I recently ventured to make as to one book alluding to the other. Isaiah recalls the overthrow of the Midianites by Gideon; and in Joshua we find quoted a commandment of God given only in Deuteronomy, Moses' successor building and inscribing an altar, etc., precisely as Moses commanded (Judges vii, 25; Is. x, 26).

I would mention, too (and no doubt Canon Girdlestone will accept a slight correction), that it is in Deuteronomy that the month *Abib* is mentioned. I do not know whether it is mentioned in Exodus as well.

Rev. CANON GIRDLESTONE.—Yes, I think so. (See Ex. xiii, 4, etc.)

Mr. MARTIN ROUSE.—But in Deuteronomy also, which is declared to be so recent, the same month is called *Abib* (xvi, 7). When we pass further on we come in the prophets to the title "the Lord of Hosts," over and over again. But never is God so-called in the first eight books named of the Bible till Samuel's time. Of course, if these books were written after the Captivity, they would have called God the Lord of Hosts, or still more likely the God of Heaven, which is the favourite title in Ezra and Nehemiah. We are told that Isaiah is a double book. In the first part of the book we get the kingdom of Christ dealt with; we also get the miraculous birth spoken of, "A virgin shall be with child" (vii, 14), and then, "For unto us a child is born, unto us a son is given; and the government shall be upon His shoulder; and His name shall be called Wonderful, Counsellor, the Mighty God, the Everlasting Father, the Prince of Peace" (ix, 6), (two of which titles are conclusive against any Unitarian view). But in the latter part, from the 40th chapter onwards, we get the preaching of John the Baptist foretold, "The voice of him that crieth in the wilderness," and also the ministry of Christ, "Behold my servant, whom I uphold; mine elect, in whom my soul delighteth; I have put my spirit upon Him; He shall bring forth judgment to the Gentiles. He shall not cry, nor lift up, nor cause His voice to be heard in the street"; this is one of various passages quoted thence in the New Testament and plainly referring to the Saviour's

ministry. And true it is that "He shall not fail nor be discouraged till He have set judgment in the earth; and the isles shall wait for His law." A little later on, in the 53rd chapter, we get the rejection and vicarious sufferings of Christ. The just preceding words are, "So shall He sprinkle" [Revised Version, "or startle"] "many nations; kings shall shut their mouths at Him; for that which had not been told them shall they see"; which describe the final triumph of His kingdom.

We are told that the Old Testament develops spiritual doctrine up to the New, not, as we might well think, that there was a fuller revelation of God in the New Testament, but that, somehow or other, there was an evolution in men's minds of their estimate of the character of God. We are daringly told that Abraham and Jephthah, in their days, thought it ~~quite~~ right to offer human sacrifices. I would say that this theory is quite incompatible with the theory which places these old books as being written after the Babylonian Captivity. If they were written after the Babylonian Captivity, how can they show the earlier stages of development in religious thought? That, of course, is an absurdity.

Dr. THEO. PINCHES.—I feel that I cannot speak very closely to the subject. It is true that I have written a book concerning the Old Testament and the cuneiform records; but I have written it on parallel lines, and not with reference to the higher criticism at all, trying to illustrate the Old Testament, as far as possible, from what I have read in the inscriptions I have studied so long.

It is needless to say that I quite agree with what Mr. Tuckwell has said with regard to the existence among other nations, before the Jews, of a great deal of enlightenment, such as we might call, in fact, knowledge of divine truth, and one cannot help coming to that conclusion. All of us have read, no doubt of Professor Delitzsch's recent lectures on "Babylon and the Bible," and there is one point he touches on therein, viz., the monotheism of the Babylonians. That, I may remark, is one of the subjects referred to in a lecture that I gave before this Society, and I referred to it rather prominently.* He says he has always insisted on the polytheism of the Babylonians, and I would say the same thing; but there must have

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* *The Religious Ideas of the Babylonians*, read on the 16th of April, 1894. (See the *Journal of Transactions*, xxviii, pp. 1–38.)

been amongst them, it seems to me, a class or section of the more enlightened of the people, who had a purer and better knowledge of the Deity than the Babylonians as a whole possessed. But I find it very difficult to speak on the points that Mr. Tuckwell has touched on. I consider this to be a most valuable paper, and I have listened to it with a considerable amount of interest. It puts the matter before us plainly, and it shows one (I speak quite as a layman on such a matter as this) how inconsistent such theories as the higher critics bring forward can be; but, at the same time, we must admit that these higher critics have done a great deal of good, and that when we come nearer to the end of these controversies we shall be able to see how far they have helped forward the subject, and enabled us to come to a true conclusion with regard to the documents with which we have been familiar so long.

I must ask you to pardon the imperfection of my remarks. It is not a subject that I have studied, but I have tried to say just a few words from the archæological point of view, as requested by the Chairman.

Dr. A. T. SCHOFIELD.—Might I say that we always hear everything against the higher critics and everything bad of them, and no doubt they deserve a great deal of it. They seem, certainly, from the perusal of many of their researches, to display what seems to us to be an extraordinary amount of incredulity and of invention and facilities for raising more difficulties than we can take in. But the point to which I speak is one of conscious irreverence, or conscious stupidity.

It seems to me we must give some of these men credit for their earnest endeavours to arrive at the truth, and that we must also give them an immense amount of credit for the value of their textual criticisms in many places. Professor Margoliouth called my attention to some, some time ago, and it is one part of their work.

It seems to me that their work is of two characters, that where it is legitimate criticism it is of real value, that where it is mere speculation of the human mind concerning what professes to be the word of God, their wisdom seems suddenly to become foolishness.

Professor LANGHORNE ORCHARD.—I am sure we shall all be glad if the "higher critics" will adopt Dr. Schofield's suggestion, and, leaving "higher criticism," confine themselves to the more useful, if less ambitious, work of textual criticism.

The able author of the paper just read has done good service in exposing, without unfairness, the nature and the method of much of present "higher criticism." These critics remind us of the scientists in Bacon's time, who, instead of going for their theory to nature and fact, spun the theory out of their own "inner consciousness," and then tried to make the facts suit the theory. If the facts proved amenable, all was well; if they did not fit, then "so much the worse for the facts." Bacon's noble protest did away with this vicious method, a method re-introduced by the "higher critics." These gentlemen, themselves being witnesses, start with a preconceived theory of evolution as one of the crutches of their system; and they find the other crutch in imagination.

Cornill affirms that the "various stages" of the Hebrew religion "are now regarded as steps in a process of organic evolution," and Graf regards the "Mosaic law-giving as it now presents itself before us, as the evidence and product of a gradual evolution out of a fertile germ, in conformity with all nature and all analogy." Cheyne (*Founders of Old Testament Criticism*) admits that he has "enlisted the imagination in the service of history," and, with charming *naiveté*, asks, "Why should we not do so"? and, referring to Hilkiah's finding of the "Book of the Law," says "it is impossible not to endeavour to fill up *lacunæ* with the help of the imagination."

Yet Dr. Cheyne might have reflected that what is permitted to the writer of a fairy tale may be denied to the inventor of a *soi-disant* scientific theory. Driver, writing about the earliest dates of certain documents, says that certainty is unattainable, for "conclusive criteria fail us and we can only argue upon grounds of probability derived from our view of the progress of the art of writing," etc. "Our view" being made both judge and jury, can we wonder at the verdict?

The author gives some instances of "higher critical" *carelessness*. Many others might be cited, *e.g.*, Wellhausen's blunders, obviously due to *inattention*, over the Hebrew words *soleth* and *kemach* and *chattath*, to which attention has been drawn by Dr. Baxter (in *Sanctuary and Sacrifice*), and the confusion by Dr. Robertson Smith, of the tent in which Moses sat to judge the people with the Tabernacle of Jehovah afterwards erected.

It is difficult to feel admiration for critics of this description. Nor does it lessen the difficulty to find that in Wellhausen's

"translation" of the Psalms, a translation which Dr. Cheyne pronounces to be "exquisite," one well-known passage is *cut out* because it is "inexplicable," and another is *cut out* because it is "unsuitable"!

Our thanks are due to the author for his valuable paper.

Professor F. J. CANDY observed that 2 Kings xix, 29, which is identical with Isaiah xxxvii, 30, was spoken in a seventh sabbatical year, to be followed by the year of Jubilee and the first common year. If you read Isaiah lxi and lxii, without a break, you will see that the ideas of restoration, deliverance, and marriage, are interwoven; showing that the prophecy was written in the year of Jubilee, that followed the deliverance from Sennacherib; on the occasion of the marriage of King Hezekiah with his Queen Hephzibah, the mother of Manasseh. (See 2 Kings xxi, 1.)

The SECRETARY.—I am unwilling to intrude on an occasion when a subject is before the Institute which may be considered the peculiar property of theologians. But when the question of the truthfulness of the Bible, both as an historical document and as a revelation of God's purposes towards mankind is in question, I feel that it is as much a matter which concerns a layman as it does a theologian, and from this point of view I venture to offer a few observations. And first, let me say how much I admire and appreciate the manner in which Mr. Tuckwell has treated his subject, in which he shows not only erudition, conciseness, and plainness of arrangement, but deep conviction of the overwhelming importance of the subject upon which he treats. Necessarily restricted by space and time, he has placed his arguments in so clear a manner that they may be comprehended by the most illiterate reader, and I hope will be extensively read.

And now let me ask if any book ever written and purporting to be an historic document, as is the case to a large extent with the Bible, has ever been treated in so ruthless a manner as have the Old Testament Scriptures by the German, and I regret to say some English critics, belonging to the school of Eichhorn and Jean Astruc? Has Herodotus, or Pliny, or Tacitus been treated in this manner? These works dealing with ancient history have doubtless been found to contain inaccuracies; but when investigations carried on at the present day in Egypt, Greece, or Italy have shown that there is a large amount of truth at the bottom of their historical statements

(as for instance Schliemann's discoveries in Troy), immediately these disclosures are welcomed by the whole intelligent world, and we are called upon to put more and more faith in the accounts they give of the nations of the ancient world. But in the case of the historical portions of the Bible it is different; for when Egyptologists and Assyriologists bring to light remarkable points in corroboration of the accuracy of the Biblical accounts, the critics in question either pass over them in silence, or endeavour to explain them away on some hypothesis conjured up from the depths of their own fertile imagination. As Mr. Tuckwell has well observed, the investigations carried on amongst the Assyrian tablets and in Egypt by such laborious workers as Dr. Pinches, Prof. Sayce and Prof. Petrie, and in Palestine by the Committee of the Palestine Exploration Society, all go to confirm the wonderful accuracy of the accounts even of the earliest books of the Old Testament; and the evidence from day to day and year to year being cumulative, amounts at the present time to demonstration such as all fair-minded men might be supposed to admit without hesitation. Witness, for instance, the remarkable case of the discovery of the Moabite stone, and its verification of the history of the Book of Kings (2 Kings iii). And here I might be allowed to add my own humble testimony as regards one very important epoch of Israelitish history, that of the Exodus, which has called forth, perhaps, more adverse criticism, on the ground of the miraculous element which pervades the entire narrative, than any other part of the Old Testament. Now, it will be admitted that there is no series of events recorded in the Bible which depend for their outcome on the topographical features to the extent of those connected with this wonderful migration from Egypt to Canaan as narrated in the Book of Exodus. The whole series of events is associated with topographical details, such as the crossing of the *then arm* of the Red Sea, the camping grounds, the valleys amongst the mountains of Sinai, which were the only highways for a great multitude of men, women, and children; the giving of the law from Sinai itself, the camping ground at its base, the streams of water for supplying drink, the Gulf of Akabah (or Ezion Geber), the Arabah Valley, the camp at Mount Horeb, Kadesh, the mountains of Edom and Moab, the crossing of the Jordan, and the plain of Jericho. It would have been impossible to construct such a narrative as that of the Exodus unless the writer of it had been

perfectly familiar with these topographical details, with places which still preserve their traditional names, with the distances between them, and special events which are minutely described both in Exodus and in Deuteronomy. It is inconceivable that any writer other than one who, like Moses, was himself a witness of the events recorded, could have written the narrative of the Exodus with the accurate topographical details which we are at this day in a position to confirm or deny by personal investigation. Now nearly all these recorded localities can be identified, and have been identified at the present day. I myself have visited the greater number; and I can speak with the utmost confidence of the accuracy of the details, and of the manner in which the events recorded fit in with the conditions of the topographical features. Could there be a more convincing proof that the events recorded were written by one who was personally present, and took a leading part in the events themselves? Moses himself claims to be the author on the ground of his own personal participation in the events, though these may have been dictated to an amanuensis. On all these grounds I claim for the history of the Exodus the same amount of credit which is yielded to the events recorded, say in Carlyle's *History of Frederick the Great*, or any similar work purporting to be a narrative of historical events.

ORDINARY GENERAL MEETING.*

GENERAL HALLIDAY IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed.

The following election was announced :—

MEMBER :—Rev. W. P. Schuster, M.A., Vicar of West Lulworth.

The following papers were read :—

ON THE GEOLOGICAL RELATIONSHIP OF THE VOLCANOES OF THE WEST INDIES. By J. W. SPENCER, M.A., Ph.D., F.G.S. (No. 1.) (With Map of the West Indian Islands.)

ST. VINCENT has been one of the danger-places of the earth, with its volcanic forces devastating the island, nearly two hundred years ago, and again a century later; hurricanes sweeping off the magnificent tropical vegetation, only three or four years since, and lately the revival of volcanic eruptions carrying destruction to the existing order of things, and building up new physical features. The general interest in such great changes has been concentrated upon Martinique, on account of the volcanic activity being on a more limited area and annihilating a whole city. It is this feature which has awakened the popular interest and drawn to the scene various scientific observers and adventurers, who have described the pathetic side of the devastation and the new conditions in the island. But working quietly at the problem of the late changes of level of land and sea, the writer, after having spent much time in the West Indies and Central America, has studied especially the phenomena which bear upon the question of the age of the volcanoes, and of their place in geological history. It is this aspect of the question which is here brought forward.

Monday, April 20th, 1903.

While the Virgin group and the adjacent small islands on the same submerged plateau with Puerto Rico, the Lesser Antilles, or Windward Islands may be considered as commencing with St. Croix* (on the south-eastern side of the great trough across the submarine plateau), and following the form of a crescent for a distance of 750 miles to the coast of South America, this physical barrier between the Caribbean Sea and the Atlantic Ocean, having a breadth of scarcely more than 100 miles, or reduced again to a width of 25 miles, is a submerged plateau dismembered into the various drowned table-lands, more or less surmounted by mountain ridges and volcanoes, now forming the Windward Islands. Everywhere we find wonderful valley-like land forms indenting the submerged plateau connecting North and South America together. The depressions in the plateau between the islands do not exceed depths of more than 2,000 or 3,500 feet below sea level. In one place only is this amount exceeded between the two continents where it is dissected to a depth of 6,000 feet, namely, in the trough between St. Croix and the Virgin Islands, between which and the continent, by way of Puerto Rico and some of the Bahama Islands, an emergence of 2,100 feet would make a continuous land connection. Among the island masses, we find submarine canyons or gorges with a corresponding depth of 6,000 feet, a broad depression between the Grenadines and Barbados reaching to from 6,000 to 9,000 feet, and elsewhere among the Bahamas there are other submarine valleys of depths of more than 12,000 feet. All these are reproductions of land features of plateau regions, such as those of Mexico and Central America, so much so that they may be regarded as evidence of the former elevation of the region, forming a bridge between North and South America, across which we now know some animals migrated in the early Pleistocene period.

The primary foundation of this barrier between the Caribbean and Atlantic basins has never been discovered, but it is probable that no geological formation or physical feature older than some part of the Cretaceous period will ever be found. Except possibly some of the volcanic formations, there is only very little information concerning any rocks as old as this period. In St. Croix and St. Thomas, Cleve found some evidence of the existence of the Cretaceous formation in that region. Possibly the "Scotland Sands" of Barbados, apparently older than the Tertiary era, may also be Cretaceous. Elsewhere

* St. Croix (Fr.), Sta. Cruz (Span.)

throughout the whole chain of islands, there is nothing excepting the volcanic basement that can be assigned to greater antiquity than that of the early Tertiary days.

The Windward Islands are practically divided into two parallel chains. The inner one commencing with Saba, continues through St. Eustatius, St. Kitts, Nevis, and Montserrat; the western of the twin islands of Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada and the Grenadines, is characterized by complex volcanic formations surmounted by volcanic cones and ridges. The outer chain from St. Croix, St. Martin, Anguilla, Antigua, Barbuda, Grand Terre of Guadeloupe, Marie Galante, to Barbados, with probably some sunken islands between the two last mentioned, is characterized by more or less calcareous formations resting upon the denuded surfaces of an old volcanic foundation. Some of these islands are in part mountainous, but of no great elevation, showing the erosion features of considerable antiquity. They are also marked by the rolling outlines of coastal plains, which extend beyond their present shores, and form the summit of the adjacent portions of the submerged plateaus. While the coastal plains, traversed by erosion features, do not prevail upon the western chain of the islands, yet in the large Saba banks, just south-west of the volcanic island of the name, we find the same features repeated at a depth of only 100 feet, or a little more, below the surface of the sea. All these calcareous formations show themselves to be only remnants of such, extending over an immense land area now dismembered and sunken beneath the sea level; and the apparent gap in their succession between the Guadeloupe Archipelago and Barbados, is represented by three banks of similar form where, it is reasonable to suppose, they are of the same character, and that they are the slightly drowned remnants of the submerged Antillean plateau.

In the outer chain of islands, we find that the volcanic basement is covered by formations of the older Tertiary era, the upper portions belonging to the Oligocene system, while the lower beds may perhaps reach down to the base of the Eocene. This gives us the clue to the age of the older volcanic formations. These rocks, without describing them accurately, are a sort of dolerite consisting of triclinic felspars with but little magnesium silicate. It is a kind of intermediate eruptive rock, which if found in Paleozoic strata would be called porphorite, and if in the Tertiary, andecite. There is nothing to establish the age of these old rocks beyond the fact that they are below the old Tertiary formation. Such volcanic deposits dissected by

the rains and streams, form the low mountains of the outer chain of islands and the foundation of the inner chain of volcanic islands, where they may be seen at many points, and on the smaller islands away from the recent volcanic cones. Typically they may be best observed in that little continent, which we call the island of Antigua, for there the erosion features of their surface have not been buried beneath the late volcanic accumulation. And here we also find the formations passing under tuffs which are themselves succeeded by the lower Tertiary limestones. In St. Kitts the south-eastern end of the island is composed of these old igneous rocks with their surface features characteristically modified by atmospheric agents, but in the centre of the island they are surmounted by more recent volcanic cones. The same is true with regard to the southern end of Martinique; but in other islands like Nevis, the mountain part of Guadeloupe, Dominica, Montserrat, St. Lucia, and St. Vincent, the old igneous foundation has been more or less buried by the later volcanic accumulations. While more detailed studies may lead to some modification of opinion, the writer is inclined to regard these rocks as the remains, left after atmospheric denudation, of a widespread igneous system, forming the apparent foundation of the modern submerged Antillean plateau.

From the evidence left in the outer chain of islands, there was little or no volcanic activity throughout the region during the greater part of the Tertiary era, though further investigations may show that eruptions occurred, in the inner chain, extravasating part of the material out of which the various stratified beds of tuffs were apparently formed in the older Tertiary days. Throughout the middle and later Tertiary periods all the region of the islands was a great land surface which was moulded by the erosion agents into features with broad rounded outlines, the higher parts of which now form the foundations of the islands. But about the close of the Pleiocene the West Indian Bridge was submerged so as to leave only small islets, and marine beds containing modern forms of life were accumulated about them. These, in several of the islands, occur resting upon volcanic sands containing recent skulls of animals, showing that the volcanic forces had again commenced to be operative before or by the beginning of the Pleiocene period, after a more or less general rest of long duration.

The renewal of volcanic activity thus appears to have been coincident with the changes which marked the advent of the Pleistocene period, but it has been confined to very much more

restricted areas than the old pre-Tertiary igneous eruptions, as we find late volcanic accumulations in the first place restricted to the inner chain of islands, and even there not covering their whole surface, without even building up connections between what are now the adjacent islands. From observations especially in St. Kitts, Guadeloupe and Dominica, and the resemblance of the igneous formations in the other islands to those first mentioned, it is apparent that the volcanic ridges and cones built upon the surfaces of the old igneous formations, owe their size and great height, reaching to 4,000 or 5,000 feet, to the volcanic eruptions accompanying the great changes of level of land and sea which have occurred since the beginning of the Pleistocene or Glacial period. The building up of the ridges of these inner islands has been due entirely to volcanic forces which have scarcely affected the portions of the island beyond the ridges themselves; but within this limit we find that the stratified beds, some of which are mechanical formations derived from the ancient rocks and stratified beneath the sea, had been everywhere tilted outward from the centre of the volcanic cones which rest upon their surfaces. These sloping volcanic beds have not been confounded with the tufaceous deposits which have been accumulated upon the slopes of the cones of which they make up almost the entire mass, as lava is found at only occasional points. While the volcanic activity at the present time is startling from the disasters that the eruptions have produced, yet it is insignificant compared with the whole amount of material which has been erupted to build up the cones.

Interesting examples of the localized effects of the eruptions in lifting and disturbing the strata, may be seen in St. Eustatius and in St. Kitts. In the latter island there is a prominence rising to a height of 700 feet with a diameter of much less than half a mile, called Brimstone Hill, which is veneered to a height of 450 feet by a bed of limestone, having a thickness of about 30 feet, dipping outward in all directions at high angles, which was the former sea bottom. This prominence was elevated by the volcanic forces pushing up a cone, which, however, was not surmounted by a crater. This elevation took place as far back as the mid-Pleistocene epoch; and as it occurs on the flank of the main volcanic ridge of St. Kitts, it suggests that the volcanic activity had greatly diminished in that island long before the present day, although more recent eruptions had built up the summit of the cone where we now find the crater. Twelve miles distant across the

sea, in St. Eustatius, a similar phenomenon was repeated; but there the sea bottom was raised to a height of 900 feet, and the prominence became surmounted by a crater now rising about 2,000 feet above the sea. No eruptions in these islands have been observed within the historic period. But this locality is situated near the north-western end of the volcanic chain.

However, in the not distant island of Guadeloupe, several eruptions occurred in the eighteenth and earlier part of the nineteenth centuries, and in Dominica, a small disturbance took place about 1880. While a small manifestation was observed in Martinique some fifty years ago, yet the volcanic forces had come to be considered inactive, and the only dangerous volcanic island was thought to be St. Vincent, where the eruptions of 1718 and of 1812 sent its *débris* as far as Barbados, more than 100 miles away.

The relationship of the volcanic activity to the physical changes in the Antillean region should be somewhat more fully explained, even though partial repetition may be unavoidable.

In pre-Tertiary times the whole Caribbean plateau was subjected to wide-spread volcanic eruptions which, however, do not appear to have been entirely beneath the surface of the sea, and later the plateau seems to have been a land surface, which was greatly modified by atmospheric denudation sweeping away any craters or cones that existed, and leaving only modified hill surfaces such as now occur between the Tertiary formations, or lie buried beneath the later volcanic ridges. Even the origin of the plateau may have been mostly volcanic, but that was antecedent to the early Tertiary period.

While the old igneous basement is found beneath the surface rocks of nearly all of the islands, yet we cannot certainly say that the pre-Tertiary eruptions covered the whole breadth of the submerged plateau between the Atlantic and Caribbean basins; for in Barbados upon its outer edge, there is a series of sand deposits, probably as old as the later Cretaceous or early Eocene days, which forms the oldest foundation in that region of which we know anything. After the completion of the now buried features carved out of these ancient eruptive rocks, and after the deposition of the sandy shore deposits just mentioned, the whole region sunk to depths unknown. In Barbados this depression, perhaps referable to the same general epoch, reached to the abysmal depth of perhaps two miles, as pointed out by Professor Harrison and Mr. Jukes-Browne, the evidence of which is shown by the oozes containing oceanic radiolaria,

etc., which were accumulated in the district now elevated to form the island. As these deposits lie beneath old Tertiary formations, their origin cannot have been later than the early part of the Tertiary period.

Passing by the minor changes, the general condition of the region in the earlier Tertiary period was one covered by the sea, at first with the accumulation of clastic strata derived from the remains of the older volcanic rocks. These were succeeded by white limestones and marls containing fossils which show their age not to have been later than the Oligocene period, by the close of which time the general construction of the Antillean plateau was formed; to be greatly denuded and carved into its present broader outlines during the long Miocene-Pleiocene period. During the earlier part of the land history, its elevation appears to have been considerable, but the altitude was gradually reduced so that about the end of the Pleiocene days its surface was reduced in area so as to leave only the present chain of islands somewhat smaller than now. During this long period of land surface, North and South America were bridged by a now sunken plateau. Throughout this long era we are not certain that volcanic activity was energetic throughout the region, and the differentiation of the many tufaceous formations of the more western islands needs further elucidation.

After the subsidence about the close of the Pleiocene period, the whole region rose to form a very high table-land, whose elevations as shown among the Windward Islands themselves, must have been from 3,000 to 6,000 feet, but from the evidence among the Bahamas and off the coast of the North American continent, it must have exceeded two miles, at a time which corresponded to the earlier Pleistocene days. This elevation seems to have been a sufficient cause of the Glacial period. Then the rapidly descending streams carved out the canyons which became great deep river-like valleys now submerged beneath the sea.

Upon the changes of level which carried down the land of the later Tertiary days below sea-level, volcanic activity after the long rest was renewed as we have already seen, and the volcanic ridges were in part upheaved and further built up by the eruptions mostly before the mid-Pleistocene period, which reduced the area of the islands to sizes smaller than now. In short, the great chain of volcanoes belongs to the late Tertiary and post-Tertiary days, being coincident with the great changes of level of land and sea.

Since the mid-Tertiary epoch there have been terrestrial oscillations causing the islands to be enlarged somewhat beyond their present size, only to again be depressed to near their present altitude. In several islands at least a slight comparatively recent elevation is noticeable, as seen by geological evidence, though we have no satisfactory records from an historical standpoint.

Thus it appears that the volcanic phenomena were closely connected with those of earth movements, which in proportion have declined as also has the volcanic activity.

While the volcanic forces have built up ridges and cones, by the accumulation of the *débris* of eruption, yet in part their elevation has been due to upper thrusts of the ridges themselves, fringed with fragments of the sea bottom; but the great changes of the whole now submerged plateau may in part have been tectonic, but if so they have been modified by what in America is called epeirogenic or slow continental movements; for everywhere the surfaces of the submarine plateau are dissected by systems of valley-like indentations which have not obscured the movements due to volcanic or other forces.

The vibrations in the rocks during the recent eruptions were sufficient to break the submarine cables, often overhanging the walls of the submerged canyons. It has also been reported that the sea bottom had collapsed in places. Such sinkings in the crust have been contradicted with the general statement that there have been no apparent changes. If such a collapse of the submarine crust had really occurred, then there might be some doubt as to the origin of part of the valley-like features, made known by the dredgings. Although the district is volcanic with caldrons and *cul de sacs* of valleys, in part originated by the destructive forces of exploding volcanoes, yet the general features are those of denudation; so that the idea that the valley forms in the submarine plateau have been due to past atmospheric action, does not seem to be affected. Accordingly, from the records of these drowned valleys, we obtain our knowledge of great changes of level of land and sea in recent geological times.

The terrestrial movements, as also the volcanic, have been mostly along the line represented by the chain of islands—the margin of the Atlantic Ocean—which has been marked as a zone of terrestrial weakness favourable to both tectonic movements and volcanic action, and suggestive of renewed volcanic activity along this course. But the recent eruptions in Martinique and St. Vincent, those in Central America and

Mexico, others reported in the region of the Azores, in Japan, and the great earthquakes of Guatemala, Chinese Turkestan, etc., all belonging to parallel zones, yet they seem to point to some terrestrial disturbance of a general common origin acting parallel with the line of the equator, as if the movements are readjusting the terrestrial crust in a transverse as well as a normal direction. In fact, we know but little about volcanicity, and it seems strange how little has been added to our knowledge by the recent eruptions almost at our own doors.

The effects of the eruptions have been made known to us in a popular way through very many media of communication, so that t' writer has deemed it desirable only to respond to the courteous request for a contribution, by telling something of the relation of the igneous formations to their place in geological history, as based upon travel among the islands; and some of his data for the opinions here expressed, have already been published, and to them the reader is referred, and for this reason, fuller detail here becomes unnecessary.

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"Reconstruction of the Antillean Continent," by J. W. Spencer, *Bull. Geol. Soc. Ann.*, vol. vi (1894).

"On the Geological and Physical Development of Antigua"; "of Guadeloupe"; "of Anguilla, St. Martin," etc.; "of the St. Christopher Chain," etc.; "of Dominica, with notes on Martinique, St. Lucia, St. Vincent, &c."; "of Barbados, with notes on Trinidad." Six papers by the present writer in *Quart. Jour. Geol. Soc.*, volumes lvii and lviii, 1901 and 1902.

Note.—The Council is indebted to Dr. Tempest Anderson for the loan of lantern slides from photos taken by himself and Dr. J. S. Flett when investigating the recent eruptions in St. Vincent and Martinique at the instance of the Royal Society. The Report was presented to the Royal Society on November 20th, 1902, and since then Dr. Anderson has contributed a paper on the eruptions to the Royal Geographical Society, which is published in the *Geographical Journal*, March, 1903.—E. H.



Map of the West Indian Islands.

ORDINARY GENERAL MEETING.*

GENERAL HALLIDAY IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed.

The following election was announced :—

MEMBER :—The Rev. W. P. Schuster, M.A., Vicar of West Lulworth.

The SECRETARY.—We have here, Mr. Chairman, through the courtesy of Dr. Tempest Anderson, of York, a number of photographic slides taken by himself when in the company of Dr. Flett. He was sent out by the Royal Society to report on the volcanic eruptions of St. Vincent and Martinique.

The CHAIRMAN.—We all owe a vote of thanks to Dr. Tempest Anderson, who has lent the slides we have just seen. [Applause.]

The Rev. JOHN TUCKWELL then read the following paper :—

VOLCANIC ACTION AND THE WEST INDIAN ERUPTIONS OF 1902. By J. LOGAN LOBLEY, F.G.S., F.R.G.S. Author of *Mount Vesuvius*, etc.

No. II.

CONTENTS.

INTRODUCTION.

THE disastrous results of the West Indian eruptions of the present year have again powerfully drawn the attention of the civilized world to volcanic action.

With the advance of education, and the development of the means of communicating and disseminating information of those natural phenomena that conspicuously affect the material well-being of mankind, an intelligent interest in these

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* Monday, April 20th, 1903.

phenomena will doubtless extend and deepen. In the future, therefore, we may expect that this interest will not be confined as hitherto to the few and these few chiefly men of science, but will be possessed by an ever-increasing number of those who claim to be educated.

The subject of volcanic action requires to a large extent the knowledge of observed facts, and also to a large extent philosophical deductions and conclusions, and consequently it appears to be a subject eminently worthy of the consideration of the Victoria Institute.

Volcanic action is indeed of such a conspicuous and startling character even when not destructive of life and property, that it has from remote times riveted attention and excited the wonder and awe of all those who have witnessed its more violent manifestations.

In ancient times, however, no attempt was made to explain it or ascertain its natural causes. It was readily accounted for, as were other striking natural phenomena, by attributing it to supernatural causes.

Classic fable abounds with allusions to volcanoes associating them with Pluto, Proserpine, Vulcan, and Typhœus. Pluto seized Proserpine in Sicily, near to Etna, and carried her down with him to reign as his queen in his own dominions far below. Vulcan, the god of fire and fusion, forged the thunderbolts of Jove by volcanic fires, and the smoke, and flames, and bellowings, and shakings of an eruption were but the evidences of his industry. The Greek Typhon was the personification of the principle of evil, and described by the Latins, under the name Typhœus, as having a hundred dragon heads, fiery eyes, a black tongue, and a terrible voice, and lying, groaning and uneasy, buried under the volcanic regions of Sicily and Ischia, all obviously suggested by the volcanic character of those islands.

In mediæval times, superstitious dread of the crater of a volcano as an opening to the place for lost souls supplanted the mythological fables of the ancients, and even at the present day this supernatural association lingers amongst the inhabitants of volcanic regions. The denizens of the immediate neighbourhood of Etna so regarded the crater 10,000 feet above them, and think of it with mind-oppressing awe.

With the eighteenth century began the scientific consideration of volcanic action, for in 1700 Lemery, long before the chemistry of Priestly and Davy, ascribed this action to chemical causes. Lemery was followed by Breislak, and later by our great English chemist Sir Humphry Davy, with similar hypotheses

since all were based on chemical action. Chemical combination, as the cause of volcanic phenomena, was also supported by Daubeny, but both he and Davy advanced on Lemery and Breislak in regarding water as the source of the supply of the essential element, oxygen.

Cordier was the advocate of the hypothesis that has been favoured for the longest time and by the greatest number. This is based on the popular assumption that the earth is a great mass of fused matter enclosed in a thin shell or crust, through which by fissures the molten matter or lava issues when the interior mass is pressed upon by the adjustment of the exterior crust required by the shrinkage consequent upon the secular cooling of the whole globe.

The difficulty of accepting a thin crust led Sir Charles Lyell and Mr. Hopkins to the conclusion that there were probably portions of the crust in a fused condition, these subterranean reservoirs of lava existing where relief of vertical by lateral pressure allowed of the interior heat exerting its melting power, and that the cause of volcanic activity was supplied by the access of water from the sea.

Dr. Sterry Hunt and my old friend the Rev. Osmond Fisher, contended for a thin exterior crust and a solid central mass with an intermediate ocean of fused matter; and the great seismologist of the last century, Mr. Mallet, attributed volcanic heat to tangential pressure from secular cooling; while, still later, Prof. Prestwich advocated the importance of land surface water as a factor in the production of eruptions, while accepting a central fluid mass as the source of volcanic lava.

The impossibility of reconciling any one of these hypotheses with all volcanic phenomena and ascertained scientific facts, leaves the question of volcanic action still undetermined and an unsolved problem. It therefore affords a most interesting subject for consideration and discussion.

VOLCANIC PHENOMENA.

In estimating the value of any hypothesis it is in the first place necessary that we be acquainted with the phenomena to be accounted for; and each and all of these phenomena must be kept clearly in view.

Volcanic action may be said to be that which ejects material on to the exterior of the globe from below the surface. A volcano is therefore essentially a communication between the interior of the earth and the exterior, and consequently it is

not necessarily a mountain or a hill, although the accumulation of the ejectamenta around the vent forms elevations of greater or less altitude and magnitude. Where, however, no accumulation takes place, as when from extreme violence the ejected material is widely dispersed, then a depression rather than an elevation is the result.

Leaving out of account such minor action as that of fumaroles, solfataras, salses, etc., volcanic eruptions may be roundly regarded as of three kinds; (1) emissive eruptions; (2) explosive eruptions; (3) partly emissive and partly explosive eruptions.

The first of these, emissive eruptions, is perhaps best exemplified by the lava flows of Mauna-Loa in the Sandwich Islands. From the two craters of this very extensive mountain mass, one, the summit crater, 13,675 feet, and the other, the crater of Kilauea, 4,000 feet above the level of the sea, a very fluid lava occasionally flows, and spreading out, forms successive sheets of basalt with a very gentle inclination, only from about 4° to 4·75°, and not separated by beds of scoriæ or ash.

In the prehistoric volcanic district of Auvergne in central France, there are domes of trachyte formed by acidic lavas without craters, which have evidently been the result of the cooling of a very viscid lava that has solidified without flowing away from the vent, which has thereby been sealed over with solid rock.

Lava flows in such cases of purely emissive eruptions are unaccompanied by noise or violence, and are merely, as it were, springs of fluid rock-matter rising from the deep interior through conduits to the surface, the lava being of different degrees of fluidity according to its varying chemical composition. The lava of Kilauea, being very basic, has indeed such great fluidity that it is drawn out into capillary glass by the wind, and this is called "Pele's hair," from the same goddess that has given the name to the Martinique volcano.

The explosive eruptions give the most terrific of all volcanic outbursts, although they are sometimes on quite a small scale.

In these eruptions no lava is seen, but instead there is an ejection, either continuously for a short time, or intermittently, of fragmentary material, with explosive violence, and thundering noises both in short detonations and continuous roars, and accompanied with subterranean rumblings and earth tremors and movements.

The material ejected and shot high up into the air—heavy masses, rounded "bombs," cindry fragments or scoriæ most irregular in form and partly vesicular, lapilli, and fine dust or ash—is often so great as to quite take away the light of the day, and the finer particles ascend to great heights and are then carried by winds and upper currents of the atmosphere to long and, in some cases, immense distances. Vast volumes of steam are given off, which condensing, form with the ash a mud, often wrongly called lava, that sometimes rolls down the slopes to the base of the volcano in a destructive torrent. Sea waves of great magnitude are also sometimes produced by displacement, or movement, of adjacent sea-bottoms and land masses either insular or coastal, which may occasion great destruction to life and property. These destructive oceanic waves are invariably wrongly called "tidal waves" by the newspapers, although they are seismic waves, and have nothing whatever to do with the tides, which are periodic. This is an illustration of the little attention paid to even the most elementary science in this country in ordinary education. Electrical phenomena are also produced, for volcanic lightning plays amongst the ascending ash-charged fumes.

The great historical eruption of Vesuvius, in A.D. 79, was an eruption of this class. By it the cities of Pompeii, Herculaneum, and Stabiæ were destroyed, and during its continuance the darkness was complete. Dry lapilli and ash overwhelmed Pompeii and Stabiæ, both at considerable distances from the crater, while a torrent of mud overwhelmed the city of Herculaneum, immediately at the foot of the mountain slopes, and no lava anywhere issued from the volcano. For a long period it would appear that the Vesuvian eruptions were explosive eruptions only, though of much less violence, since it was not until A.D. 1036 that there was any record of a lava-flow there, although in pre-historic eruptions, as shown by the basaltic rocks of Monte Somma, lava was abundantly emitted by this vent.

The Krakatoa eruption of 1883 is the greatest recent example of a purely explosive eruption, and by it the island of Krakatoa was almost destroyed. It produced complete darkness, and ejected by its explosive force the material of two-thirds of an island of thirteen square miles, covering the adjacent seas with floating lapilli of pumice. Its fine ash was carried upwards to a height estimated at 50,000 feet, the finest and highest having been carried three times round the globe, and occasioning the very beautiful sunsets of that time,

conspicuously seen in this country. The eruption was heard 3,000 miles away, it produced an ocean-wave that caused great devastation, and an atmospheric wave that affected the barometer of Greenwich Observatory.

In the same region, the eruption of Papandayung, in the island of Java, in 1772, was of such terrific violence that a depression fifteen miles by six was formed, the whole mass previously occupying that area having been blown away.

A purely explosive eruption on a small scale was that of Monte Nuovo, near Baiæ on the shore of the Bay of Naples, in 1538, by which a cratered hill was formed by an ejection of fragmentary material from a newly opened vent, from which no lava has ever flowed.

The eruptions that are both emissive and explosive are the most usual, and they exhibit the most varied phenomena, since in these the characteristics of the non-explosive are added to those of explosive eruptions. The modern eruptions of Vesuvius and the eruptions of Etna and Hecla, are good examples of this class. Premonitions are commonly given by earth-tremors and subterranean rumbling noises occurring immediately preceding, or very shortly before, the outbreak; and very delicate and elaborate instruments, such as the late Professor Palmieri's seismograph at the Royal Observatory on Vesuvius, are sometimes employed for the detection and registration of these warning symptoms.

According to their character and relative violence these eruptions may be termed "strombolean," when there is slight but, during a prolonged period of time, continuous eruptive energy; moderate or normal, when the eruption is not a very great one; and "paroxysmal," when it is of much more than usual violence.

A flow of lava may either precede, accompany, or follow, the ejection of scoriæ and ashes, and may flow over a lip of the crater or through a tunnel in the crater-wall, or it may be emitted from an opening or openings on the slopes of the volcano. Eruptive energy may also be manifested at more than one point at the same time on the same volcano. Thus violent explosive ejections of scoriæ and ashes may be going on from the summit crater while lava is being quietly emitted from one or several orifices far below.

The explosive ejections, accompanied by a rushing roar, occur with very small intervals of time between, but they are usually distinctly separated when the eruption is not of great violence. The fine volcanic ash, much of it the result of the

trituration of repeatedly ejected scoriæ, is not ejected to the enormous elevation it reaches by the explosive force, but is carried up by the ascending column of hot steam and gases, which in the heavier cold air rises to very high regions before being altogether dissipated or condensed.

The West Indian Eruptions.

Probably no volcanic outburst has been the subject of so much descriptive writing as that of the West Indian eruptions of the year 1902. Voluminous accounts have appeared in the daily press of Europe and America, articles containing much detailed description are to be found in the monthly magazines, in one of which the subject occupies 50 pages,* and several special commissions of expert observers have visited the islands and reported on the eruptions and their results. It will, therefore, only be necessary here to very briefly state the general features of the eruptions and to indicate the phenomena that were exceptional and peculiar.

There is no difficulty in classifying the whole of the outbursts, both in Martinique and St. Vincent, as explosive eruptions, for although the early accounts mention "lava," all that has since appeared show that there has been no emission of fluid lava. There were the usual premonitions of eruptive activity after dormancy; subterranean rumblings, accompanied by emissions of steam, had been heard for three months before the outburst; ash-clouds had begun to darken the sky in the latter days of April; and on May 2nd soft ashes lay 16 inches deep over the Savane of the city of St. Pierre. On May 3rd the so-called "smoke" was illuminated, indicating the presence of incandescent matter in the crater throat below. On May 5th a deluge of hot mud poured down not from the summit crater of the Martinique volcano, La Montagne Pelée, 4,000 feet, but from a vent at about 2,400 feet above sea level, where had been the "Etang Sec," a dry depression since the eruption of 1851 until April 27th last, when it held a pool of water 600 feet in diameter.† This great flow of mud overwhelmed the lower grounds and a large manufactory, the Usine Gúerin, at the foot of the mountain, just as Herculaneum at the foot of Vesuvius was overwhelmed by volcanic mud in A.D. 79.

After two days of less violent activity, May 8th (1902) wit-

* *The Century Magazine*, August, 1902.
† *Fortnightly Review*, August, 1902.

nessed the appalling total destruction of a town with its 30,000 inhabitants in less than a quarter of an hour. This terrible catastrophe was caused by what must be regarded as an exceptional phenomenon. It has been variously described, and it is not a matter for surprise that the descriptions of some eye-witnesses under the terrors of their experiences were not scientifically accurate. It was said there was a "sheet of flame" spreading out horizontally over the city and burning everything beneath. In *The Times* the phenomenon was described as "a combination of suffocating heat, noxious vapours, a shower of burning cinders and a discharge of burning stones." Dr. Flett and Dr. Tempest Anderson, reporting for the Royal Society, say, "The most peculiar feature of these eruptions is the avalanche of incandescent sand and the great black cloud which accompanies it," and again, that "a mass of incandescent lava rises and wells over the lip of the crater in the form of an avalanche of red-hot dust, it is lava blown to pieces by the expansion of the gases it contains. It rushes down the slopes of the hill, carrying with it a terrific blast, which mows down everything in its path. The mixture of dust and gas behaves in many ways like a fluid. The exact chemical composition of these gases remains unsettled. They apparently consist principally of steam and sulphurous acid. There are many reasons which make it unlikely that they contain much oxygen, and they do not support respiration."*

Professor Heilprin has confidence in the report of the officers of a French cable-ship that was about eight miles distant, who while "watching the tall column of 'smoke' issuing from the summit crater, observed a puffing cloud rise from the flank of the volcano, followed immediately by a dense black vaporous mass which with intense rapidity rolled down the mountain slope, hanging close to the surface, and becoming brilliantly luminous as it approached the sea-border."†

On May 20th a similar phenomenon seems to have occurred which destroyed much that had been left standing by the eruption of May 8th, and again during the visit of Drs. Flett and Anderson on July 9th an outburst took place with a similar incandescent avalanche, and still later, on August 30th, when the town of Morne Rouge and three villages were destroyed.

Professor Heilprin is of opinion that the eruption of

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* *The Times*, August 21st, 1902.

† *Fortnightly Review*, August, 1902.

May 8th was not from the summit crater which previous to these events had held a small lake, called the Lac des Palmistes, but from a "lower vent which had opened on the western slope of the mountain," which he appears to think was that from which the mud-flow of May 5th was discharged. He also considers that the "glowing cloud was mainly composed of one of the heavier carbon gases brought under pressure to a condition of extreme incandescence, and whose liberation and contact with the oxygen of the atmosphere, assisted by electric discharges, wrought the explosion or series of explosions that developed the catastrophe."

In these accounts from highly competent observers there is some ambiguity and some divergence. From what follows, the phrase, "a mass of incandescent lava" cannot refer to fluid lava but to solid ejectamenta in a finely divided state, or properly volcanic ash, or, as it is elsewhere called in this report, "dust" and "sand." To this incandescent ash one report seems to attribute the appearance of a sheet of flame, and the other to actual incandescent gas which may rightly be called "flame." All accounts, however, agree in recording the characteristics of explosive eruptions as they have been already here described.*

The eruptions of St. Vincent were generally synchronous with those of Martinique, but the principal outburst took place on May 7th, a day on which La Montagne Pelée was not particularly active, but the day before the great explosion of that volcano. The Soufrière gave a premonition of renewed activity on May 5th by a disturbance of the waters of the lake which then occupied its old crater. On the following day its eruptions commenced, accompanied by violent earthquake action, the issue of great volumes of steam, and by loud explosive thunderings. Then on the next day, May 7th, St. Vincent's great outburst took place. Its terrific explosions could be heard throughout the Caribbean Sea, while immense volumes of steam rose to great altitudes. We are told that "A huge cloud in dark dense columns charged with volcanic matter rose to a height of eight miles from the mountain top, and darkness like midnight descended. The sulphurous air was laden with fine dust, and black rain followed rain of scoriæ, rocks and stones."

* Many of the phenomena here described were witnessed by Dr. T. Anderson and Dr. Flett, and are described, with illustrations, by the former observer in the *Geographical Magazine*, March, 1903.

It was this dust, or fine ash, of which samples have been brought to this country from the islands of Barbados, where it fell at a distance of 100 miles from its place of discharge. As will be seen from the specimens, this volcanic ash is a fine grey powder, the largest particles being less than $\frac{1}{30}$ of an inch. Under the microscope it is found to consist of crystals of plagioclase felspar, hypersthene, augite, and magnetite with a small amount of volcanic glass. An analysis by Dr. Pollard gave the following result* :—

Silica	52·81
Oxide of titanium	·95
Alumina	18·79
Peroxide of iron	3·28
Protoxide of iron	4·58
Oxide of manganese	·28
Oxide of cobalt and nickel	·07
Lime	9·58
Magnesia	5·19
Potash	·60
Soda	3·23
Phosphoric acid	·15
Sulphuric acid	·33
Chlorine	·14
Water	·37
	100·35

It is an interesting fact that the ash from St. Vincent was carried to Barbados by an upper current of air moving in the contrary direction to the surface wind which was the ordinary "trade wind" of the region, from east to west, the island of Barbados being due east from St. Vincent.

Apart from the extraordinary incandescent avalanches of the Martinique volcano, the West Indian eruptions of 1902 have not exhibited phenomena other than normal. Their magnitude has been often exceeded, and in our own times the Krakatoa eruption of 1883 was a much greater one, with much more topographical derangement, and equally great destruction of human life.

* *Nature*, June 5th, 1902

Geological and Geographical Conditions and Results of Volcanic Action.

For a due estimation of the sufficiency of any hypothesis of volcanic action it is, however, not enough to consider only the phenomena of eruptions. The larger facts, both geological and geographical, consequent upon, or incidental to, volcanic action, not only in the present epoch, but during past periods of the earth's history, must be taken into consideration, and their relative importance carefully valued.

These are so numerous and varied that a volume would be required to do justice to their interesting and important characters. All that can be done here is to give a brief summary, and with this I must now content myself.

The outputs of volcanic eruptions relatively to the bulk of the globe are individually infinitesimal, and in their aggregate form only a small part of even the land surface of the earth.

There is no general constant flexibility of the earth's surface, each subsidence or upheaval being local and of limited duration, while astronomical calculations and the general stability of land and sea during long periods prove great rigidity of the exterior of the globe as a whole, and consequently a great thickness of solid rocky substructure.

The inorganic Palæozoic conditions of the earth's surface were generally similar to those of Neozoic times, as shown by similar organisms, ripple-marks, worm-burrowings, rain-pittings, etc., and Palæozoic volcanic action does not appear to have been greater than Neozoic, while the highest mountain ranges have received a large amount of their present elevation since the close of the secondary period.

The specific gravity of the globe is only 5·5, although that of surface rocks is over 2·5, while the pressure at the centre is calculated by Walterhausen at 2,498,600 atmospheres, and by Laplace at 3,000,660.

Heat increases with depth below the surface at a rate that if continued would give rock-fusion, under atmospheric pressure only, at from 25 to 30 miles, and at half the distance to the centre a temperature equal to that of the sun, an impossible heat, and consequently there is not a continued uniform increase of heat.

Rock-fusion resulting from relief of vertical pressure in subterranean regions would not, with an open vent, be limited in lateral extension, and surface ruptures would be produced with lava outputs on a scale far transcending any catastrophes

that have ever occurred; yet volcanic action has gone on for long periods of time in many areas without causing any surface derangements other than the building up of conical hills or the rupture of very small areas.

Areas of great volcanic activity in Palæozoic and even in Tertiary times, although still contiguous to the sea, are, and have been for prolonged periods, perfectly unvolcanic, and insular volcanoes in more recent times have become extinct without change of geographical conditions, as in Madeira and the Canary Islands.

Lavas from different volcanic regions though having a general resemblance, are not the same in composition, and some present considerable differences; while the products of the same volcanic centre at different periods may be respectively trachytic and augitic, as those of the Alban Hills; or may be characterized by different mineralogical features, as those of the Somma-Vesuvian centre; and moreover trachytic and augitic lavas may respectively be emitted by each of two vents in the same volcanic region.

Lava solidifies with a small loss of heat, lava flows of little volume solidifying rapidly, and many lava flows are small.

Eruptive energy may suddenly occur where no volcanic vent previously existed, in some cases followed by a continuance of activity, as at Jorullo, and sometimes after a brief outburst followed by perfect quiescence, as at Monte Nuovo.

Two volcanic craters on the same dome may not be sympathetic in activity, as Kilauea and Mauna-Loa, yet the eruptive axis of a volcano may alter its position as in Vulcano and Vulcanello, and the volcanic foci of Etna and Vesuvius were calculated by Mallet to be only a few miles deep.

The chief *Northern* European Tertiary volcanic outpouring, that of the lavas of Antrim, Iona, Staffa, and Mull, was in the same geological epoch as the great Central European subsidence, and the great *Central* European outpouring, that of the lavas of Auvergne, Central Germany, Bohemia, and Hungary, was contemporaneous with the principal Central European Tertiary elevation. The Andean Central American and West Indian volcanic regions are rising, or geologically recently elevated, areas; and, generally, volcanic action is on *rising* rather than subsiding areas.

Active volcanoes, with few exceptions, are near the sea or water areas, and inland extinct volcanoes were similarly situated at the period of their activity, as in Auvergne and Hungary, while extinction of activity has followed the removal of the

coast-line to a very moderate distance, as in the neighbourhood of Rome.

Steam is a most abundant and sea-salt a common product of explosive eruptions, and some volcanic tufas consist largely of marine *Diatomaceæ* as in Patagonia.

Enormous flows of lava have been poured on to the surface without explosive effects, and there are vast beds of lava-rock not associated with volcanic scoriæ or cones, as in Antrim, Abyssinia, and Idaho; and Plutonic igneous rock-masses and dykes have been also formed without explosive effects.

Volcanoes quite dormant for many centuries have sometimes commenced a new epoch of activity, as Vesuvius in A.D. 79; and sometimes after an eruption have relapsed into complete quiescence, as Epomeo in 1302.

Pressure caused by shrinkage of the earth's crust would be tangential, not vertical, and the heat produced by the crushing pressure of rocks is not localized at the points of contact, but disseminated through the rock-masses synchronously with production.

2,000,000 tons pressure are removed from every square mile of the earth's surface when the barometer falls two inches, and observations of the activity of Stromboli and Vesuvius seem to indicate an approximation to periodicity of eruptive energy coincident with (1) autumn and winter; (2) the lunar syzygies; and (3) with hygrometric atmospheric conditions.

Antecedent to eruptions, earthquakes, or earth-tremors, occur, especially, and more violently, previous to the opening of new vents, as at Jorullo and Monte Nuovo, and after long dormancy, as before the first historic eruption of Vesuvius.

Though great volcanic activity may occur at particular periods, yet no sympathy between the eruptive energy at two well separated vents has been with certainty found to exist.

This statement of governing facts to be kept in view when an endeavour is made to explain the cause of volcanic action, though brief and incomplete, is perhaps sufficiently comprehensive to prevent a too ready acceptance of inadequate hypotheses, while it may serve to show as well the difficulty as the highly interesting character of the subject. So difficult, indeed, does it appear to the authors of geological works, that for the most part they content themselves with a description of phenomena and a statement of some hypotheses, while refraining from giving any explicit opinion of their own.

THE CAUSE OF VOLCANIC ACTION.

The due consideration of the cause of Volcanic Action would require a treatise and, therefore, all I can do here is to give an outline that may be useful, and to refer my hearers or readers to where I have dealt more fully with the subject.* For the sake of brevity and clearness it may be well to proceed by the method of elimination.

The hypothesis that must first be disposed of is that of all lava being derived from one great central source, or, in other words, that the globe contains in its interior a vast central body of fused rock-matter that gives to all volcanoes their lava and other ejectamenta.

This is based on several considerations. The increase of temperature with descent from the surface, found in mines and borings, will give a rock-fusing heat at from 25 to 30 miles depth if continuous. The Nebular Hypothesis of the origin of the Solar System gives an original heat to the earth-mass equal to that of the sun at the time of detachment, and which heat would be greatly above the fusion point of rocks. This high temperature would be very largely retained in the interior of the earth-mass, while the exterior would cool and solidify, and

* Report, British Association, Bath, 1888, p. 670.
"On the Causes of Volcanic Action," *Proc. Geol. Assoc.*, 1889, vol. xi, p. 1.
Mount Vesuvius, 1889, chapter viii, p. 212.
Report, British Association, Oxford, 1894.
"On the Climate of the Cambrian Period," *Knowledge*, November, 1894, vol. xvii, p. 260.
"On the Mean Radial Variation of the Globe," *Quart. Jour. Geol. Soc.*, 1895, vol. li, p. 99.
"On the Cause of Earthquakes," *Knowledge*, July 1895, vol. xviii, p. 161.
"Volcanic Phenomena," *Jour. City of Lon. Col. Sci. Soc.*, 1896, vol. iv, p. 1.
"The Foldings of the Rocks," *Knowledge*, 1896, vol. xix, p. 162.
"On the Source of Lava," and
"On the Post Cambrian Shrinkage of the Globe."
"The Mean Radial Variation of the Globe." Rep. Brit. Assoc., Liverpool, 1896.
Presidential Address, 1896, *City of Lon. Coll. Sci. Soc., Jour. of Soc.*, vol. iv, p. 69.
"On the Depth of the Source of Lava," *Quart. Journ. Geol. Soc.*, 1897.
"The Crust of the Globe and its Disturbances."
Presidential Address, 1897, *City of Lon. Coll. Sci. Soc., Jour. of Soc.*, vol. v, p. 1.

thus it was concluded a fused mass would remain in the interior enclosed in a solid crust. There is, besides, a general similarity in the character of volcanic ejectamenta in all parts of the world.

It has, however, now been ascertained by physical research and astronomical observation, that the rigidity of the earth as a planet is so great that it must either be a solid sphere or have a solid crust of very great thickness, from 400 to 800 miles at least, a thickness of massive cooler rocks obviously far too great for lava to pass through. Lord Kelvin is of opinion that the earth is solid to the centre. The increase of heat with descent will in its fusing effect be counteracted by the enormous pressure of the exterior rocks, and thus solidity may be maintained at a very high temperature. The general similarity of volcanic ejectamenta may be explained by the general similarity of the crystalline rocks which form the platform, as it were, upon which the clastic or sedimentary rocks are superimposed, and which, therefore, we must conclude, underlie the derived rocks everywhere around the lithosphere of the globe. These primordial rocks are made up of minerals that are combinations of but a few chemical elements in the aggregate, and so on being melted will give generally similar products. And it is only a general similarity that exists, since there is a considerable divergence in specific chemical composition to be found in the outputs of different volcanoes.

From these considerations, the central source hypothesis must be regarded as quite inadmissible, and ought now to be looked upon by all writers on the subject as obsolete, and yet this hypothesis is implied in much that is written on volcanoes in recent works and especially in newspapers.

The wide-spread opinion, however, that lava is derived from a distance of about 30 miles from the surface, is not dependent on the central source hypothesis, since it is compatible both with separated reservoirs of fused rock matter in a thick crust, or in an otherwise solid globe, and with an intermediate Ocean of fluid lava between a solid central mass and a solid crust.

Lateral pressure relieves and lessens vertical pressure, and so at places in a thick earth's crust it was said the great vertical and fusion preventing pressure of the exterior rocks may be so much lessened by lateral pressure that the internal heat may exert its fusing effect, with the result of converting solid rock-masses into subterranean lakes of molten rock-matter, from which the surface volcanoes receive their supplies of lava.

To this it may be replied. that a thickness of 30 miles of

rocks cooler than lava at their base and becoming continuously cooler to the surface, even with a conduit throughout, is much too great a thickness for lava to pass through unsolidified. A lava column of 100 feet diameter would give a much greater flow than the great majority of lava emissions either in the present epoch or in past geological periods. Yet this would be a mere thread in proportion to its length of 30 miles. From the records of many eruptions, I find that an ascending movement of 1 foot per second will give an unusually rapid flow of the more mobile or basic lava, yet at this rapid rate the lava would require 44 hours to travel from a base of 30 miles depth, all the time in contact with cooler and, as it rose, with increasingly cooler rocks. Fluid lava has little excess of heat over the fusion point and consequently with little loss of heat it solidifies. Such a column of lava would therefore solidify long before reaching the surface. But the great majority of lava-flows are much smaller than one from 100 feet column, and in a great number of cases are very small flows. These must, therefore, be from very thin columns or from very slowly ascending columns, and in either case the possibility of the fluid lava reaching the surface must be dependent on a comparatively small depth of source.

There is, again, another objection that seems to me to be even more conclusive against a 30 miles depth of the source of lava. This is that there could not possibly be a fissure or conduit through 30 miles of rocks, or, indeed, through rocks at all approaching that thickness. The weight of a column of ordinary rock of 1 square foot section is 400 tons per mile, or 800 tons for two miles. This exceeds the crushing weight of granite, which is 720 tons per cubic foot. Although in great mass, from lateral resistance of the contiguous rock-masses giving a counteracting resultant force, the full weight of 800 tons would not be exerted at 2 miles depth, yet it would at a somewhat greater depth, and thus, as M. Tresca has shown, at a depth of more than a few miles from the surface, the rocks, although solid, will "flow," or move horizontally, if laterally unsupported, and consequently cracks or fissures at these depths are impossible. Hence it will be quite safe to say that no openings exists below a few miles from the surface.

Thus it would appear that both the central source of lava and the 30 miles distant source of lava, must be given up, and with them, of course, all hypothesis founded on those bases. This narrows and simplifies the inquiry very greatly, since, with the elimination of these hypotheses, we can no longer regard the

internal planetary heat of the globe as that which fuses rocks and gives volcanic lava, for the internal heat at less depths than 25 miles is altogether inadequate for the melting of rocks even under the small atmospheric pressure of surface conditions.

But the rock-fusing temperature that gives fluid lava has to be accounted for.

This at the moderate depth which will alone allow of communication by a conduit with the surface, it seems to me, can only be explained by chemical action being brought into play. This, however, does not exclude whatever effect the planetary heat existing at that depth is capable of exerting. At a depth of five miles there is doubtless, in accordance with the Report of the British Association Committee on Underground Temperatures, a temperature of about 500° F. Heat favours chemical action and will cause it to arise where under cooler conditions no chemical action would take place. But chemical action may be prevented or checked by pressure, and the normal pressure at five miles depth is enormous. Then this vertical pressure may be greatly relieved by lateral pressure and other causes, and when so relieved, chemical reactions that had been prevented at a favouring temperature by greater pressure would commence. This chemical action will give an accession of heat that may give rise to further and more intense chemical action that will still further raise the temperature. By this action and reaction heat may be augmented until a rock-fusing temperature is reached. Such action, of course, would only take place where the contents or composition of the rocks gave suitable elements for chemical reactions, and for only so long as those conditions continued. Thus volcanic action in definite and limited areas, as well as the local extinction of volcanic action where geographical conditions are unaltered, may be readily explained.

Although lessened, the pressure of the exterior rocks may yet be great, and this together with the increase of volume by fusion and the expansion of adjacent rocks by the neighbouring great heat, will force the lava upwards through any conduit available. Such a rise of lava may bring it into contact with the water of the exterior rocks, when hydrothermal conditions, or the sudden production of steam, will cause explosive effects and give the earth-tremors and thunderings of incipient eruptions, and may also produce rendings of the surface rocks, and so form passages for great and sudden influxes of sea or

lake water, that will then cause the greater explosive effects of eruptions, and produce the vast volumes of steam that ascend above the eruptive craters.

Should the lava not find a conduit extending to the surface, Plutonic dykes may be formed far below; and should lava reach the surface without meeting with water, a purely emissive eruption will be the result.

The great paroxysmal explosive eruptions, such as the recent West Indian outbursts, may, therefore, be regarded as due to the formation and rise of an unusually large body of lava, together with the supply to the volcanic conduit of sufficiently large bodies of water, to transform the whole into solid fragmentary ejectamenta. As the fusion temperature of rocks is above the critical point of water, some of the water may be decomposed by the disassociation of its elements, and free hydrogen being thus evolved some of the effects stated in the reports of the recent eruptions might be produced by the inflammability of that gas.

The time of an eruption may, I consider, be determined by one or more of several factors, that will be sufficient to give the requisite relief of vertical pressure. Amongst these factors will be lateral pressure, secular elevation, planetary or lunar attraction, and hygrometric atmospheric conditions. In illustration of the relief of pressure consequent upon the last-named factor, it may be mentioned that a fall of the barometer of two inches will remove pressure from the area of the base of Mount Etna alone, to the extent of two thousand millions (2,000,000,000) of tons. The islands of Martinique and St. Vincent, with the other islands of the Lesser Antilles, are on the crest of a long ridge that has been elevated in comparatively recent geological times, and the elevatory movement has apparently not yet altogether ceased. It is this elevation with its consequent relief of pressure that has most probably been the cause of the renewed volcanic activity in the Windward Islands of the West Indies.

The explanation of volcanic action which I have here ventured to give is in accordance with an hypothesis I brought before the British Association so long ago as the Bath Meeting of 1888. As I have not since become acquainted with anything to shake that hypothesis, perhaps I may be pardoned for having some confidence in its soundness, which appears to me to be supported and illustrated by the West Indian eruptions of 1902.

DISCUSSION.

The CHAIRMAN.—Our Secretary, who has had to leave, has put into my hand his remarks on the two papers.

The SECRETARY much regretted that neither of the authors of these two valuable papers were present. He had hoped that both would have been with them this evening—as the date for reading had been originally fixed in order to meet their convenience. But Professor Spencer's arrival in England had been delayed owing to various causes. He was, in fact, at that moment crossing the Atlantic, and is expected to arrive about the 28th of this month. Professor Logan Lobley writes that he was obliged to leave England for France and Spain on the 14th inst., and that he greatly regrets not being able to read his paper and take part in the discussion, which he hopes will be interesting.

We have to express our thanks to Dr. Tempest Anderson, of York, for the use of the lantern slides of photographic views taken by himself when in company with Dr. J. S. Flett. He was engaged in reporting, last year, for the Royal Society on the phenomena displayed by the volcanic eruptions in the West Indian Islands. These will have given members a better idea of the character and effects of the eruptions than any oral or written description; they are well reproduced in Dr. Anderson's paper, published in the *Geographical Journal* for March, 1903.

The two papers before us this evening appear to be complementary. Each deals with an aspect of the subject not treated in the other. Professor Spencer's paper gives us very precise details regarding the physical structure of the West Indian Islands, which have, for several years past, been the objects of his special and arduous investigation. He has shown us that these islands have undergone great vertical movements of elevation and depression; that there were volcanic outbursts on a much larger scale than those of recent times at a period which cannot be definitely fixed, beyond the fact that they are older than the Tertiary period, and it is satisfactory to know that the volcanic eruptions have decreased in intensity into recent times. He also maintains his view that the plateau of the West Indian Islands formed a great causeway during the Pleistocene

epoch (which was one of great elevation of the sea-bed and land) by which the two continents were joined, and by means of which land animals migrated from one continent to the other, and finally he points out the connection between the oscillations of level and the outbursts or subsidence of volcanic activity.

Professor Logan Lobley, while referring to the West Indian volcanoes, deals with the source and origin of volcanic action on broad principles, which can scarcely be gainsaid. By his work on *Mount Vesuvius*, and his numerous papers in scientific publications, he has taken a high place amongst authorities on vulcanicity, and I quite agree with him that the central-source theory is untenable. I do not think, however, that he sufficiently recognizes the necessarily distinctive sources of the heavy basic, and the lighter acid, lavas as originally determined by Durocher, nor does he account for the sequence of these varieties of lava at apparently the same source as in the case of the Siebengeberge in the Rhine Valley, where the light acid trachyte was succeeded by the basic basalt lava. These, however, are minor points, and do not detract from the intrinsic value of the essay, and they may not have come within the scope of his communication.

ORDINARY GENERAL MEETING.*

GENERAL HALLIDAY IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed.

The following elections were announced :—

ASSOCIATES :—Rev. G. Juhlin, Arvika, Sweden ; Herr S. Sundholm, B.A., Sentula, Finland ; Rev. Charles C. Petch, Gorakhpur, India.

The following papers were read : —

No. I. Report on the Congress of Orientalists held at Hamburg in September, 1902.

No. II. The Laws of the Babylonians, as recorded in the Code of Hammurabi.

No. I.

REPORT ON THE CONGRESS OF ORIENTALISTS HELD AT HAMBURG IN SEPTEMBER, 1902. By THEOPHILUS G. PINCHES, Esq., LL.D., M.R.A.S.

IT was promised us, when the invitation reached Rome in 1899, that we should have a right good welcome in the great commercial city of Hamburg, and that everything would be done in a superior manner. And as a matter of fact, our welcome was of the most cordial nature, such as the German nation knows well how to extend. A committee, appointed for the purpose, found for us lodgings at prices in accordance with the indications given, and they performed their work well, for there are not many Orientalists who know Hamburg, and though most of the visitors would have preferred to choose their lodgings themselves, the kind offices of the committee were a great saving of time and trouble.

The first reception of the Congressists was on the eve of the day when the assembly was to begin work. This took place in

* Monday, May 4th, 1903.

the Concert-house, where a band enlivened the monotony of the conversation. In accordance with what is apparently the German custom, each person paid for what he required, but as the refreshments available were not always to the taste of the nationalities represented, the trade done by the waiters of the institution was small. The assembly was welcomed by Professor Windisch, of Leipzig, president of the Congress and also of the German Oriental Society. He was followed by the Chairman of the Senate, Dr. D. Behrmann, whose speech of welcome was a specially gratifying one to the Assyriologists present, and showed what an important place their study had taken in the circle of researches dealing with the East, and this has been emphasized, as many of my audience are aware, by the interest which the German Emperor has taken and probably still takes in it, as is shown by his having attended Professor Fried. Delitzsch's lectures, concerning which I shall have something to say later on. Dr. Behrmann, in the course of his remarks, pointed out that a hundred years before, on the 4th September, 1802, Grotefend laid before the Society of Sciences at Göttingen his paper upon the decipherment of the Persian Cuneiform Inscriptions, in which he had reasoned out at least eight letters of that system of writing. In a manner never hoped for (he continued) light had been thrown upon the gloom of antiquity, for the boundary of knowable things had been shifted back a fourth part of ten millenniums. It was difficult to say whether the century which had just begun would be as fruitful in discoveries as that which had so lately come to a close, but there was no doubt that the members of the Congress would work full of strenuous earnestness into the future, then on the evening of the present century; a thankful posterity would say, in the words of the Arabic proverb, *Al-faḫra lil-mubtedi, wa in aḥsanu 'l-muqtedi,* "Honour to the beginner, even though his successor has done better."

We found that the sections of the Congress would meet in the Concert-house, where the first reception had been held, with the exception of the Egyptian and the Indian sections, which met at the State laboratory. This was naturally in the highest degree inconvenient for those who took an interest in these subjects and in the doings of the other sections, the two buildings being rather far apart. Moreover, the sundered sections did not come very often into contact, and, therefore, did not have an opportunity of exchanging ideas and notes.

In all probability one of the most tedious things in connection

with a congress is listening to all the speeches of salutation or greeting which are given, at the first plenary meeting, by the representatives of the various governments. There were at the Hamburg Congress fifteen of them, and what they had to say, with the addresses of the president and vice-president (Herr Senior D. Behrmann and Burgomaster Dr. Mönkeberg), who, with the other vice-presidents, were then elected, brought up the total of the speeches to about twenty. The listener cannot escape from the feeling that such time might be better spent. Nevertheless, one feels naturally a certain amount of interest on such occasions when someone gets up to speak in the English language (which happened fairly often), or when the speaker made his remarks in a language seldom heard, as did the Egyptian delegate, Ahmed Zeki Bey, who uttered his words of salutation in Arabic, to the great gratification of all those who know anything of that language. As to the speech of the Chinese delegate, that was naturally for the extreme few, but it was made comprehensible to most of the audience by rendering into very excellent German by his Chinese interpreter. It was noted that some of the United States delegates, even those with English names, sometimes preferred to speak German. In the afternoon sectional meetings took place, so that there was no loss of time in getting to work.*

As it will be impossible for me to refer in detail to all the papers which were read, I propose to speak of such of them as may be regarded as of general interest to the members of this Institute, though my own predilection will naturally be manifest, especially as those which I heard were, to some extent, papers dealing with my own subject, whilst the remainder were related thereto more or less. Unlike other congresses of Orientalists which have been held, no short abstracts of the papers have been issued, so that the general public and the members of the Congress who were unable to attend all the meetings find themselves in almost absolute ignorance of the value of the papers which they were unable to hear. The London Orientalist Congress held ten years ago was, in this respect, far away in advance of that of Hamburg, which cannot claim, therefore, to be a place where such things are managed better.

As, after the election of Professor Buhl as President of the

* It is worthy of notice, that this was the first Orientalist Congress at which the Government of Ceylon has been represented, the delegate being Don Martino de Zilva Wickremasinghe.

fifth (General Semitic) Section, I was the first of those asked who had his manuscript with him, my paper upon "A Small Collection of Babylonian Tablets from the Birs Nimroud," being an account of a portion of the collection belonging to Lord Amherst of Hackney, was the first read. The Birs Nimroud, as probably most of my audience know, is the ruin of the great temple-tower at Borsippa (of this word Birs is probably a corruption), which was a religious centre of considerable importance at the time Babylonia existed as a nation, and is regarded by many as the place where the Tower of Babel stood. The documents described were mainly contract-tablets, and covered a period dating from some interregnum, when Assyrian influence was supreme, to the time of Artaxerxes. This earliest tablet, of the time when there was no king of the native line in Babylon, is dated in the reign of an eponym, a kind of mayor in the city of Babylon, named Ubar. It is the only instance of dating by eponyms in Babylonian history known to me, and is of considerable importance on that account. The names of the witnesses imply that the document belongs to the reign of the Assyrian king Esarhaddon, who, as we know from the Old Testament and the inscriptions, sometimes held his court at Babylon.

As is well known, after the reign of Nabonidus, when Belshazzar, his son, seems to have held a position equal to that of king, the Babylonians never regained their political liberty. This, however, does not mean that they never tried, as the tablet dated in the reign of Šamaš-iriba, which was studied many years ago by Professor Oppert, sufficiently shows. Further confirmation of this I was able to bring forward, by quoting two of Lord Amherst's collection, one dated in the reign of a Babylonian named Bêl-šimanni, and the other in that of a Persian which I read doubtfully as Šikušti. It will therefore be seen that the Babylonians of the Persian period were not particular as to the quarter whence the change which they desired came—they would have preferred a Babylonian ruler, in all probability, but failing that, they were willing to acknowledge another foreigner. Doubtless their opinion was, that under the new ruler things might be much better, and could not very well be worse.

An interesting paper read at the same sitting of the General Semitic Section was that of Professor Paul Haupt, of Baltimore, U.S.A., upon the name of Tarshish, which he regarded as simply a place for crushing ore, and therefore applicable to any district where there was a foundry, or smelting-furnaces.

The root is generally compared, it will be remembered, with the Syriac *rashsh*, "to hammer." This would be in many ways an acceptable theory, but how Tarshish comes to be the name of a precious stone, translated in the Authorized Version "beryl," but according to the Septuagint and Josephus the chrysolite, requires explanation. That the word occurs as the name of a Persian prince probably yields but little help.

A noteworthy paper was that of Professor Merx, of Heidelberg, upon "The Influence of the Old Testament upon the Development and Formation of Universal History," which was read at the first plenary meeting. He said that without the exchange of ideas which had taken place between Orient and Occident, in its broader sense, our civilization would have been quite different from what it is at present. Referring to the uncritical way in which Herodotus approached the East, Professor Merx said that, with the genial simplicity of a true artist of story-telling of the first rank, Herodotus presented to us the account of all the known nationalities, mingling together history and legend, always interesting, and approaching the legends by no means uncritically; but he only presents what is of importance on account of its relation to Greece. Of a consecutive history of mankind, directed towards a definite end, he knows nothing; the race which resulted from the stones of Deucalion and Phyrrha have for him no united history. Diodorus Siculus, on the other hand, had the idea of general history as something continuous and fixed, and in his time the task of the historian was conceived as one in which he had to arrange in order the subject of which he treated in such a way as to show the association of races who, however, are divided from each other by time and space. But the historian at this period found himself in a great difficulty, for how was he to gain a uniform series of historical events, with their contemporaneous reciprocal influences, when a united chronology was entirely wanting? Inquiring then how Old Testament history arose, and how it was systemized, Professor Merx said, that if there had ever been a nation which regarded itself as the centre of the world, that nation was the Jews. The various component parts of which Old Testament history is made up cover already, in the ninth century, when the Jehovist found his material, every kind of historical document. In this history his glance is as it were a universal one, as is proved by the ethnical table, which he incorporated into his work, and which is wrongly ascribed to another source. If we look closer at his work, we see that he has the unity of the human

race, the unity of God, who made and rules heaven and earth, and along with that the unity of the universe when he had no name for it. He had got as far as the Greeks, at a time when the pseudo-Aristotelian book upon the world was written, in which the cosmos is a system consisting of heaven and earth together with the beings contained therein, and among the many divine names only one God is accepted. (We may here note, that the Babylonians had already reached this point at a period yet to be determined, but which cannot be later than 500 B.C., and may be as early as 2500 B.C.) It would be impossible, however, to go over all the ground covered by this interesting lecture, which ought to be read in full to get an idea of its importance and suggestiveness.

A paper of more general interest was that of Ahmed Zeki Bey, of Cairo, which was entitled, "The invention of gunpowder and cannon attributed to German genius in the fourteenth century, according to Arab authors." He began by referring to the dispute between scholars, as to whether gunpowder had been invented by the Chinese or the Spaniards. Though an Egyptian himself, he had come to another conclusion. In the libraries of Vienna, Constantinople, and Algiers was a manuscript, bearing the title, "The honour and the advantage which accrue to those who carry on war with the help of cannon." This work was written by a Moor of Spain in Spanish (he having forgotten the language of his forefathers) in the year 1635, and translated by a former interpreter to the Sultan of Morocco. The author, like the translator, was a pious Moslem, and took to heart the expulsion of his compatriots, who were at the same time his co-religionists, from Spain, and this book was written as a means of advising them how to regain the lost provinces. It is divided into fifty chapters, and in the course of the work he speaks of the invention of gunpowder, which he attributes to a monk 265 years before his time—that is, in 1370. He praises especially the Germans, who, he says, were the cleverest masters in this engine of warfare. Clearly the claims of Roger Bacon were, in his time, unrecognized on the Continent.

Papers upon Semitic pet-names, the superscription of the book of Jeremiah, and the present primitive Semitic sacrificial sites, the last by Professor Curtiss, of Chicago, were among those next read. In my own speciality, Professor Oppert read a paper upon the translation, which he had recently made, of the great cylinder-inscription of Gudea, that containing his celebrated dream, which I hope to touch upon at greater length

at some future time. Papers upon the pronunciation of Hebrew were not wanting, as that of Professor Guidi, of Rome, and Dr. Ginsburg, of London, on the paseks, showed. Perennial with Professor Halévy is the question of the Semitic character of the Babylonian syllabary, which, strange to say, notwithstanding that, at the Congress of Paris, many "anti-Akkadists" or "anti-Sumerists" declared themselves, was listened to in chilling silence, though several of those erstwhile "anti-Sumerists" were present at the meeting.

Of considerable interest was the account of the excavations by the German Palestine Fund at Ta'annek, by the explorer, Professor Sellin, of Vienna. It was described as an important Canaanitish city, which was destroyed by the Assyrians, and is not again mentioned until the fourteenth century. The ruins excavated are three hundred mètres long, and they lie near a village bearing the old name, Ta'anach, consisting of a mosque and about twenty huts. The pottery of the site has the usual black concentric lines, and bronze implements and figures of Astarte were found. Of special interest was a black cylinder-seal with the Babylonian name Atanaḫ-îli, servant of the god Nergal, similar to the numerous examples belonging to the period of the dynasty of Ḫammurabi. Among the graves excavated were some regarded as being those of sacrificed children, and altars, thought to have been used in connection with the rites attending these sacrifices, were found. In the south portion a destroyed room, with amulets and human remains, were likewise discovered. An ornamented altar among the ruins was described as being exactly like the Mosaic altar of incense.

In view of the interest attaching to Professor Friederich Delitzsch's two lectures entitled *Babel und Bibel*, and the German Emperor's decision thereon, a short paper upon the name of Yahwah (Jehovah) by Professor Bezold, will probably be regarded as of greater interest than most of the other communications, though it cannot be said that it settled the point in question, namely, whether the name occurs or not either one way or the other. All the possible ways of reading the supposed original form of Jehovah were quoted, and the question aroused a certain amount of discussion. The names in which this divine appellation occurs are contained in inscriptions copied by me for the Trustees of the British Museum, and published by them in the series of inscriptions they are now issuing, entitled, *Cuneiform Texts from Babylonian Tablets*, parts iv and viii. The transcription of one of these names does

not admit of doubt, and was referred to by me in my paper upon "The Religion of the Babylonians 2000 years B.C.," read at the Paris Congress for the History of Religion in 1900. It is the Babylonian equivalent of Joel, Yau^{m}-îlu, meaning "Jah is God," and cannot, at least with our present knowledge, prove the existence of the name Yahwah (Jehovah) at that early date.

The other two forms Delitzsch reads *Ia-a'-ve-ilu* and *Ia-ve-ilu* respectively, and it must be admitted that they are both possible readings, especially if we change the *v* into *w*. I have no hesitation in saying, however, that if Professor Delitzsch's transcription of the character before *îlu*, whether written with *v* or with *w*, be correct, its identification with the original reading of the name Jehovah is exceedingly improbable. As was pointed out in the discussion which ensued, the form is a later one than that found 1500 years later, namely, Yaawa or Yâwa, which occurs in several names quoted in the paper upon "The Religious Ideas of the Babylonians," read before this Institute in 1895. It is to be noted, however, that the reading necessitated by the early date of these names is also possible, namely, *Ya'wa-îlu* and *Yawa-îlu*, in which case Professor Delitzsch would be right, and the names in question would mean "Yahwah (Jehovah) is God," though his transcription would be slightly incorrect.

The readings *Ya'pi-îlu* and *Yapi-îlu* are possible, and this fact has to be taken into consideration. Professor Delitzsch's theory, however, with the modification in the transcription which I have proposed, will always have to be regarded as one of the more probable ones, and may be accepted, with reserve, until material comes to light to prove the reading one way or the other.

Before closing, there is one point which may be referred to, and that is the question of the publication of the transactions. In consequence of the motion of Professor Naville, the suggestion that abstracts only of the papers read should be printed was adopted. The reason of this is that the volumes of papers do not, as a rule, appear for several years after the Congress has been held—it is only a short time since the second and third volumes of the Transactions of the Congress, held at Rome in 1899, were announced as ready for delivery to the members, and this is, undoubtedly, an undesirable state of things. The issue of abstracts, it was supposed, would fully meet this difficulty, and it was provided in the resolution that the abstracts sent in for publication should not exceed two

pages, and the volume containing them should be issued within six months. The writers of papers were to have the right of printing them in full in any publication which seemed good to them.

It was at once seen by many, however, that this might be the death-blow to Congresses. A number of people subscribe to them without having any intention whatever of being present, their only desire being to receive the publication which it is the custom to issue. It is needless to say that their money is a very welcome addition to the funds of the Congress, and the people who stop away ought to be encouraged to add to the number of subscriptions received. There is also the possibility to be taken into consideration, that many of the people who are accustomed to attend Congresses may decide to refrain in consequence of the absence of transactions. To all appearance, however, it was only the small minority which realized these disadvantages, and this being the case, the proposed more than doubtful reform was carried by an overwhelming majority.

Under this new rule, the abstracts of the papers ought by now to be in our hands, but when they will appear, no one knows. This, indeed, was foreseen at the outset, and one speaker upon the subject went so far as to say, that it was very doubtful whether the promised abstracts of papers would appear at all. With a view to clear up this question, I wrote to the Secretary of the Hamburg Congress, Dr. Sieveking, and received in reply the assurance that the volume would not only appear, but was actually in the hands of the printer. This was reassuring news, but it will be very much behindhand, I fear. Some of the contributors of papers may have received their proofs, but nothing of that nature has as yet reached my hands, and to all appearance two months more must elapse ere the volume reaches the members. The Congress of Rome surpassed that of Hamburg greatly in this respect, for full reports were issued to the members every day, enabling its progress to be easily followed, and how full they were may be judged from the fact, that in their reissued form, the daily bulletins total 273 pages of closely-printed matter. One hardly wants anything more than this, and if the Hamburg Congress had issued something even half as extensive, one could have put up with the delay in issuing the volume of abstracts, and might even reconcile one's self to the abandonment of the issue of Transactions.

No. II.

THE LAWS OF THE BABYLONIANS, AS RECORDED IN THE CODE OF ḪAMMURABI. By THEOPHILUS G. PINCHES, Esq., LL.D., M.R.A.S.

STRANGE to say, Ḫammurabi's Code of Laws, that remarkable addition to our knowledge of the rights of man when the world, in the sense of the people who inhabit it, was young, was not referred to by the Assyriologists who attended the Orientalist Congress at Hamburg. In all probability they had not had time to study it in all its bearings, and had nothing very new to say about it, for Father Scheil, in his hastily-published translation of the inscription, had practically covered all the ground, and new points worth writing a paper about had to be looked for, not only in the code itself, but in the many contract-tablets which illustrate it. Indeed, the work of illustrating this new edition to our knowledge of the legal system of the Babylonians and Assyrians is only now being done, requiring, as it does, scholars specially gifted with a talent for that branch of the work.

Notwithstanding all that has been written concerning this remarkable document, it is very probable that there are comparatively few persons who have a clear idea of what it is like, and the nature of the information which it gives, with the bearing of that information upon the legal literature of the Babylonians; and it is probably on this account that the Council of the Victoria Institute expressed the desire to know something about it—a request to which I willingly accede. At the outset I must say, however, that I do not come before you as the one who is to make this remarkable, but in many respects difficult document clear and plain in every respect to all, for that would not only require that legal knowledge in which I am deficient, but much more time than I have at my disposal. My desire is, therefore, to be regarded rather as the popularizer of the contents of the code as far as it is likely to interest the majority of the members of this Institute.

The monument upon which this important inscription is engraved is about 7 feet 6 inches in height, and is made of a dark-coloured stone described as diorite. It is covered with inscription on all four sides, except where the bas-relief representing King Ḫammurabi before the Sungod is, and a portion which has been erased, making a considerable gap, in

which, as Professor Scheil suggests, an Elamite king, Šutruk-naḫḫunte, who ruled a thousand years later, intended to carve his own name, as he had done on several other monuments found at the same place. The inscription itself consists of a rather long introduction, the code of laws itself in about 280 sections, and a recital of Ḫammurabi's perfections and noble deeds. Naturally a text like this, with 3638 lines of writing in all, notwithstanding that these lines are short, must be of considerable value, not only for the laws of the Babylonians, but also for their legal terminology, their manners and customs, and, indirectly, for the history of their civilization. The publication issued by the French Government, and the translation accompanying it, contributed by Professor Scheil, are worthy of the highest praise.

It would be difficult here to give a complete list of the laws, which, to say the truth, are not very well classified, but among them are to be found enactments dealing with attempts to thwart the ends of justice, theft, kidnapping, fugitive slaves, housebreaking, brigandage, the hiring and letting of fields, orchards, etc., the borrowing of money, commercial travellers, female drink-sellers, deposit and distraint, marriage, adultery, inheritance, the position of female-slaves (illustrating the story of Hagar and Sarah), apprenticeage, adoption, violence (illustrating the dictum "an eye for an eye and a tooth for a tooth"), medical treatment, housebuilding, navigation and freighting, the hire of animals and men, pasturing, and the hire of boats, and other things. These and many other matters are treated of, and not only is the law laid down, but the pay, for instance, of a workman, or a physician, or the amount of hire for objects required for temporary use, etc., are indicated.

Noteworthy is the fact that the first two sections deal with the casting of spells, which, if not justified, was evidently considered a serious offence. The following are the laws referring to this:—

"If a man ban a man, and cast a spell upon him, (if) he cannot justify it, he who has banned him shall be killed."

"If a man has cast a spell upon a man, and has not justified it, he upon whom the spell has been thrown shall go to the river-god, (and) shall plunge into the river. If the river-god take him, he who banned him may seize his house. If the river-god show him to be innocent, and he be saved, he who banned him shall be killed, (and) he who plunged into the river shall seize the house of him who banned him."

There is a certain amount of difficulty about these two laws,

and to understand them well, it would be necessary to have a more precise definition of the technical terms used. Professor Scheil states that they relate to witchcraft in the first and the second degree, the first referring to an anathema, the second to sorcery of the ordinary kind. This is probably correct, but it is still needful to know under what circumstances such banns or spells were cast, and what constituted justification. In all probability such things were done with the hope of preventing an opponent or rival from doing something to the disadvantage of the person banning—perhaps, at least in the first instance, to thwart the ends of justice. That this is probable, may be surmised from the two laws which immediately follow:—

"If, in a judgment, a man seek to discredit the witnesses, and has not justified the word he has spoken—if that judgment be a judgment of life (and death), that man shall be killed."

"If he has offered wheat or silver (*i.e.*, money) to the witnesses, he shall bear the wrong of that judgment."

"If a judge has given a judgment, has decided a decision, (and) has delivered a sealed tablet (referring thereto), (and) then afterwards has changed his judgment, that judge, for the judgment he has judged and changed, they shall summon, and the claim which was in that judgment he shall repay twelve-fold. And they shall make him rise up in the assembly from the seat of his judgeship, and he shall not return, and he shall not sit with the judges in judgment."

Though enacted with the best of intentions, there is but little doubt that this was an unfortunate law, for in face of the penalty and disgrace attending it, few judges would be found who would reverse a decision once given. There is but little doubt that it was intended to lessen continuous litigation, to which the Babylonians seem to have been very inclined. Perhaps it simply means, that an appeal could not be heard before the judge who had given the decision, but had to be taken to another, and perhaps higher, court. That these three laws concerning the integrity of justice are among the first of the code, shows in what estimation absolutely just decisions were held, and suggest that the two preceding enactments, which head the code, probably had something to do with thwarting the ends of justice also, or with superseding it by the appeal to supernatural or demoniacal agencies.

The laws which follow have to do with theft. Stealing or receiving things stolen from a temple or a palace was punishable with death, and the same penalty attended the purchase or receipt on deposit of things from another man's son or servant,

which was also deemed theft. On the other hand, the stealing of such a thing as an ox, a sheep, an ass, a pig, or a ship (boat), either from a temple or from a palace, was attended by the penalty of thirtyfold restitution, unless the thief was a poor man, in which case he refunded tenfold only. If, however, he had not the wherewithal to pay, he was to be put to death.

The drastic nature of some of the enactments is well illustrated by the laws referring to the purchase of lost property, one of which states that if the owner of the object lost (*bêl ḫulkim*) be unable to bring witnesses who recognize that object, he is a liar (or something of the kind),—he had stirred up deceit, and was to be put to death. In these and similar cases the intention apparently was to discourage the bringing of actions at law.

Further instances of severity, however, occur in the enactments dealing with the female drink-sellers, which, from their nature, are of more than ordinary interest, and point to the giving of credit extensively for the drink which they supplied. Indeed, from this and other inscriptions one gets the idea that the Babylonians were dreadful winebibbers:—

"If a wine-woman has not accepted grain as the price of drink, (but) has accepted silver by the great stone (probably the ½ mana, the 'little stone' being ⅓ mana), and has set the tariff of the drink below the tariff of the grain, they shall summon that wine-woman, and throw her into the water."

In all probability every wine-woman took care to know how to swim.

"If a wine-woman, (when) riotous fellows are collected at her house, does not seize them and take them to the palace, that wine-woman shall be killed."

Ladies of high degree, especially if they had anything to do with a temple, had to be careful of their conduct:—

"If a devotee, who dwells not in the cloister, open a wine-house, or enter a wine-house for drink, that female they shall burn."

The wants of the thirsty field-labourers were carefully safeguarded:—

"If a wine-woman has given 60 qa of second (?) quality drink, for thirst, she shall take 50 qa of corn at harvest-time."

But in all probability my audience will be most interested in the enactments which illustrate the Mosaic code, especially those of "an eye for an eye, and a tooth for a tooth." In the space of a short paper, such as this must necessarily be, I am unable to treat of this branch of the subject fully, but the

points upon which I am able to touch will be found, I think, to be of interest both from the Biblical and other points of view.

Simple restitution was very justly exacted in kind—goods for goods, an ox for an ox, an ass for an ass, a slave for a slave. For cheating, for the loss of another's goods by carelessness, for theft, etc., the compensation varied from threefold to thirtyfold. Their system differed from ours in that they did not resort to the punishment of imprisonment to any great extent; the punishment was either restitution with proportionate and exceedingly heavy damages, or death.

Injury to the person, however, could not be made good. A member of the body could not be replaced, so that the punishment which seemed to the Babylonians, as to the Hebrews and other nations of antiquity, to be just, was that of making the evil-doer like the person upon whom he had inflicted the injury. But it was not only eye for eye, tooth for tooth, limb for limb, but also son for son, and slave for slave; for a man's son once departed this life, could never be restored to him; a substitute would not supply the loss, and the same, in a lesser degree, could be said for his slave, who was not always one purchased for money or corn, but born, or at least brought up, in his house, and therefore knowing his master's ways, and the special routine of his household, and probably also having a corner in his heart.

The following are the principal of the laws relating to retaliation:—

Šumma awēlum în mâr awēlim uḫtabbiṭ, în-šu uḫappadu.

"If a man has destroyed the eye of the son of a man, they shall destroy *his* eye."

Šumma nerpaddu awēlim ištebir, nerpaddu-šu išebbirru.

"If he has broken the limb of a man, they shall break his limb."

Šumma în muškini uḫtabbiṭ, û lu nerpaddu muškini ištebir, ištin mana kaspi išaqal.

"If he has destroyed the eye of a poor man, or broken the limb of a poor man, he shall pay 1 mana of silver."

Šumma în arad awēlim uḫtabbiṭ, û lu nerpaddu arad awēlim ištebir, mišil šimi-šu išaqal.

"If he has destroyed the eye of the servant of a man, or broken the limb of the servant of a man, he shall pay half his price."

Šumma awēlum šinni awēlim meḫri-šu ittadi, šinna-šu inaddû.

"If a man has made the tooth of a man who is his peer to fall out, they shall make his tooth fall out."

Šumma šinni muškini ittadi, šuššan mana kaspi išaqal.

"If he has made the tooth of a poor man to fall out, he shall pay ⅓ of a mana of silver."

Here follow the laws concerning the breaking of the head of a superior, an equal, and a poorer man, the respective penalties being 60 blows with a whip, a mana of silver, and 10 shekels of silver. If the culprit was a slave, his ear was cut off.

Unintentional injuries inflicted in a quarrel entailed responsibility for the doctor's bill, or, if the person died of those injuries, the payment of half a mana of silver in the case of a free man and one-third in the case of a poor man, as compensation.

For the death of another man's daughter, the daughter of the aggressor was killed, unless the father of the slain woman was of inferior rank, in which a money penalty was provided.

It is after this part that the very interesting enactments concerning physicians, their pay when successful, and the penalties to which they were liable in case of non-success, are inserted:—

Šumma azu awēlam zimmam kabtam ina GIR-NI siparri îpuš-ma awēlam ubtalliṭ u lu nagabti awēlim ina GIR-NI siparri ipte-ma în awēlim ubtalliṭ, êšrit šiqli kaspi iliki.

"If a physician has treated a man for a severe wound with a bronze lancet, and has cured the man, or has opened the cataract of the man's eye with a bronze lancet, and has cured the eye of the man, he shall receive ten shekels of silver."

"If he be a poor man, he shall receive 5 shekels."

"If he be a man's slave, the master of the slave shall give two shekels of silver to the physician."

Šumma azu awēlam zimmam kabtam ina GIR-NI siparri îpuš-ma awēlam uštamît u lu nagabti awēlim ina GIR-NI siparri ipte-ma în awēlim uḫtabbiṭ, ritté-šu inakizu.

"If a physician has treated a man for a severe wound with a bronze lancet, and has caused the man to die, or has opened the cataract of a man with a bronze lancet, and has destroyed the eye of the man, they shall cut off his hands."

"If a physician has treated the slave of a poor man for a grave wound with a bronze lancet, and caused him to die, a slave like the slave he shall return to him."

"If he has opened his cataract with a bronze lancet, and has destroyed his eye, he shall pay half his value in silver."

Šumma azu nerpaddu awēlim šebirtum uštalim, u lu šer ḫanam marṣam ubtallit, bêl ṣimmim ana azu ḫamšet šiqli kaspi inaddin.

"If a physician has made whole the broken limb of a man, or has cured a diseased bowel, the patient shall give to the physician five shekels of silver."

"If he be a poor man, he shall give 3 shekels of silver."

"If he be the slave of a man, the master of the slave shall give to the physician 2 shekels of silver."

These are followed by the rules for veterinary surgeons and surgeon-barbers.

Naturally there is a considerable amount of doubt as to the exact nature of the surgical operations referred to, especially that in connection with the curing of the eye. Both Professor Scheil and the Rev. C. H. W. Johns translate the word *zimmu* or *ṣimmu* (the latter is the correct form) as "wound," and in this I have followed them, but it seems to me, that the translation "operation"—"If a physician has performed a severe operation on a man"—is also worthy of consideration. I take this word to be quite distinct from *simmu* (with ס), "malady," especially of the eye, on account of the differing sibilant. Be this, however, as it may, there is another still more important word, namely, *nagabtu* (as transcribed by Scheil), which he renders "*taie*," or "cataract," but which Mr. Johns translates by "abscess."

As to which is the right rendering, I do not express an opinion; to the lay mind one seems as good as the other. The question naturally arises, and can be best settled by medical men, namely, "Do abscesses commonly affect the eye?" For it to be the subject of a legal enactment, it must naturally be a fairly common disease, and dangerous to the sight. In the important tablets published in the 2nd edition of the *Cuneiform Inscriptions of Western Asia*, vol. iv, plate 29*, and "Additions and Corrections," pp. 7 and 8, which refer to remedies, including incantations, for diseases of the eye, *nagabtu* does not occur, though the ordinary word, *nagbu*, written both ideographically and spelled out in full, seems to be there. To all appearance we have in these inscriptions the most valuable data for deciding whether the disease of cataract was treated, and also what its name was. *Nagbu* or *naqbu* means "water-channel," "spring," also "mountain-torrent," and could, therefore, easily stand for "cataract," a meaning which the longer form *nagabtu* or *naqablu* might also have In this case, likewise, the question might be asked, whether the etymology suggested leads us in the right path.

From the medical point of view, however, a certain amount of information is available and may serve to indicate the true meaning. I learn from Dr. Emmeline Da Cunha that abscesses in the eye-ball are exceedingly rare, so that it is extremely improbable that laws would be made in which they were specially mentioned; and that it would be quite useless, moreover, to operate upon such abscesses with a lancet.* On the other hand, operations for cataract by native practitioners are common in the East, at least in India, and some of these men, who are mere quacks, simply push, by means of their instruments (a kind of spatula) the crystalline lens into the vitreous humour. The patient is then able to see, but loss of sight results in consequence of the lens not being completely removed, and it was probably to prevent such criminally unskilful treatment that the laws here referred to were made.

In the Mosaic law, it was enacted, that "if men strive together," and anyone get hurt, "then thou shalt give life for life, eye for eye, tooth for tooth, hand for hand, foot for foot, burning for burning, wound for wound, stripe for stripe," and though all these things are not mentioned here, there can be but little doubt that the intention of the Babylonian code was, that the principle should apply to all the cases of injury possible. It is not likely that they drew the line at the life, the eye, and the tooth of a man, or the breaking of his bones. The two codes may in this be regarded as in perfect agreement.

But not only are the enactments of the Laws of Moses illustrated, but we find, both in the interesting code which I am now briefly describing and in the legal documents of the period to which it belongs, noteworthy parallels to circumstances referred to in other parts of the Bible. Of special interest in this connection is the case of the giving of Hagar by Sarai to Abraham because Sarai had no children. Several tablets referring to the marriage of more than one wife by a man occur among the inscriptions of Babylonia, the most interesting of them being those referring to the two wives of Arad-Šamaš, and the conditions attending the marriage of the inferior wife. Another case is that of Šamaš-nûri, daughter of Ibi-Šân, who was brought by Bunini-âbi and Bêlisunu, his wife, from her father, "as a wife for Bunini-âbi, as a servant for

* The only operative treatment would be the removal of the eye-ball.

Bêlisunu." The price paid was 5 shekels of silver. In this inscription provision is only made for the eventuality that Šamaš-nûri might deny her mistress, in which case her hair was to be shaved off, and she was to be sold. Hagar, however, was apparently lower in station even than the woman referred to on this tablet, and was driven out with her son to perish for much less, apparently, than merely denying her mistress.

Naturally it seems strange that any woman should give to her husband, as in the case of Abraham and the man mentioned in this inscription, another wife, who was bound to be her rival. The desire that her husband should have children to perpetuate his name does not altogether explain it, and the adoption of an orphan-child, or the child of a poor man or a widow with little or no property, would have overcome the disadvantage of childlessness sufficiently well—at least, that would seem to be the case, and would certainly be the lesser evil of the two to the wife. It is here, however, that the code of Ḫammurabi is again of value, as the following enactment shows:—

Šumma awêlum aššata iḫuz-ma aššatu šî amta ana muti-ša iddin-ma mârê uštabši, awêlum šû ana šugetim aḫazim pani-šu ištakan, awêlum šuati ûl imaggaru-šu—šugetim ûl îḫḫaz.

"If a man has taken a wife, and that wife has given a handmaid to her husband, and she has had children, (if) that man set his face to take a concubine, they shall not allow that man (to do so), he shall not take a concubine."

According to this, a childless woman gave another wife to her husband to prevent him from going himself and taking a concubine. The matter is therefore explained—a wife preferred to choose herself the woman who was to replace her, and she chose one who would be subordinate to her, not one who might become a really serious rival. Now that we know all the circumstances, the matter is more explicable to the European mind, and the Biblical narrative likewise gains, though we wish that both Sarai and Abraham had treated Hagar more considerately.

According to Pfarrer J. Jeremias, there are no less than twenty-four enactments in which the Laws of Ḫammurabi exhibit certain, or almost certain, analogies with the Book of the Covenant, in which sometimes the one, sometimes the other, seems to be the more primitive and rude. For all these, however, I have not at present time. My intention was to give simply a short description of the code, leaving the comparisons for some future communication. The examination of over 280 legal enactments is not to be compressed within the

compass of one short paper—not even the most important of them.

But besides the laws, there is the monument itself. It is a splendid example of Babylonian stone-work, and the relief showing the king before the sungod is especially fine. The surface of the stone, which is described as diorite, has suffered in places, where it may be supposed that the material was a little soft, and has therefore been affected by the weather, but except where the Elamite king has erased a portion of the text to inscribe his own name—which, however, for some reason he failed to do—it is practically in the condition in which it was when it left the sculptor's hands. Besides the laws, the introduction and concluding peroration are worthy of attention. The former refers to the various gods and temples of Babylonia, and in this inscription it would seem that Ilu, God as the Lord of the world and the creator of all things, which Professor Scheil has boldly reproduced by the west-Semitic El—it will be remembered that Ḫammurabi belonged to a foreign dynasty, notwithstanding that he is regarded as having been a Babylonian—was probably really the god whom he worshipped, and this circumstance may prove to be of importance in the history of the religions of the Semitic East. In this introduction he not only speaks of all the principal cities of Babylonia: Babylon, Dur-îlu, Ur (of the Chaldees), Sippar, Erech, Nisin or Isin, Ḫarsag-kalama, Cuthah, Borsippa, Dilmu (Dailem), Lagaš, Girsu, Ḫallabi, Muru, Adab, Malkā, Mera, Tulul, and Agadé, with their gods and their temples, but he also refers to the two principal cities of Assyria, namely, Aušar or Aššur, and Ninua (Nineveh). That Aušar or Aššur existed and was an important place at the time his dynasty reigned, we know from the tablets of the period to which that dynasty belonged, and which are now in the British Museum; but this is probably the earliest mention of Ninua (Nineveh) in Assyria, which is to be distinguished from Nina, near Kinunir, in Babylonia.

At the end he describes how he had made his people, with the help of the gods, dwell in security, and the long reference which he makes to the temple Ê-sagila at Babylon, the great temple of Belus, leads to the suggestion that the monument was carved to adorn the courtyard or some other prominent place in the grounds of that edifice. If this be the case, it is probable that the conjecture that the monument was carried off from Babylonia by some Elamite ruler, probably Šutruk-naḫḫunte, is correct. For us it is a fortunate circumstance that it has been so well preserved—had it remained on the site

where it was first placed, injury or destruction at the hands of Sennacherib and his ruthless soldiers might have deprived posterity of one of the finest and most remarkable monuments which have come down to us of that great empire within whose centre the germs of civilization, if they did not have their birth there, were at least fostered, and encouraged to grow into that healthy tree which now overshadows the earth.

The knowledge of Ḫammurabi's code of laws was not confined to Babylonia. Though we did not know it, fragments of a copy of it have been in the British Museum for from twenty to fifty-five years, and notwithstanding that one of the fragments bore the colophon stating that it was the "Laws of Ḫammurabi"—*Dinānī Ḫammurabi*—it was not recognized, and is even described in the Catalogue as a "Legend" of that king. This, however, shows that other copies of the document existed at Babylon, from which these Assyrian transcripts were made. It must have served, as many of the contract-tablets show, as the basis of the law of both countries for many hundred years, and if ever superseded—which is uncertain—must have formed the basis of any further enactments which were made.

Discussion.

The Secretary (Professor Hull, M.A., etc.).—Mr. Chairman, ladies and gentlemen, I wish, on behalf of the Council, to express our deep gratitude to Dr. Pinches for the production of these two papers, but especially for the latter. He had promised, some time ago, to give us an account of the proceedings at the Congress of Orientalists, which he has done; but when this wonderful and interesting monument of ancient Babylonian art and history was found and became recognized and described in the *Times* and various other papers, the Council thought that some account of it from such an eminent Assyriologist as Dr. Pinches, would be very acceptable to the Institute. So he very kindly agreed to somewhat curtail the first paper in order to give time for the second, and I am sure we all feel deeply grateful to him for what he has brought forward this evening, and the paper gains special interest from the fact—as stated by Dr. Pinches himself—that the Babylonian king is the

Amraphel, King of Shinar, in Genesis, 14th chapter, and contemporary with Abraham.

The CHAIRMAN.—Perhaps Dr. Chaplin would tell us something about diseases of the eye, as that subject has been referred to.

Dr. CHAPLIN.—I am afraid I cannot say much about diseases of the eye in ancient Babylon, but judging from analogy I should say that diseases of the eye in that part of the world were and are very much the same as the diseases of the eye in Egypt and Assyria, where these diseases, owing to various circumstances, are much more frequent than they are in more temperate climates.

I was much interested in what was said in the paper about operations on the eye. I remember a quite common Persian came down to Jerusalem when I was living there—a man who had no pretence to education or position in society—but his business was to operate for cataract, and with very inferior instruments and inferior knowledge of the anatomy of the eye, he would very often perform successful operations.

Sir HENRY HOWORTH, D.C.L., F.R.S.—Mr. Chairman, ladies and gentlemen, I have no right to intervene at all, because my knowledge is not first-hand, as it ought to be in discussing a paper of this importance. I came here to-day for more than one reason. I am a trustee of the British Museum, and as trustee of that great establishment I am never tired of rehearsing the claim to our gratitude which we owe to my good friend who read these papers, and whose admirable work as an Assyriologist—not merely his cuteness, but his efforts and discoveries, are only matched by those of Professor Sayce in this realm. I am delighted that he is so active, and I hope he will go on with his activity until he is as old as Methuselah.

I remember how good an account he gave of what took place at the Congress. I have taken off my hat more than once in front of this great monolith of Ḫammurabi, and there it stands, it seems to me, a royal monument in stone with the inscriptions of Augustus, who was especially honoured all through the eastern world. Now the portrait of this wonderful king, the beautiful portrait of this very king, is on a large plate of clay or stone—I think a clay monument—at the British Museum, and it is drawn in bas-relief with all the precision of a beautiful cameo. There he is with his lovely beard, and it is so beautifully finished that I think you ought all to go and look at it. Now that this particular king has become so

famous, we must also remember as instancing the fact that he and his dynasty have nothing to do with Babylonia, that they belong to the same race that gave this early dynasty to the South Arabian District, that on the inscriptions were found the names of two members of the same dynasty exactly as they appear now on this inscription, so we have come to call this the South Arabian dynasty. Some people have been troubled (I do not know why) to find that a large number of enactments and laws which related to the civil status of the Jews, should have been found existing amongst the neighbours of the Jews at this very early date. Surely nothing could be more natural. You cannot, by any process under heaven, impose a great code of laws by a jump. Such codes are all the result of a long process of preparation, and they cannot go very far ahead of the moral standard of the people whom they affect. If they do, they fall in abeyance. They represent a long period of growth, a gradual development which we call the ethics of jurisprudence, and it is very natural that we should find that a large number of those enactments should relate to people so closely connected with the Jews. Vaghler has published a beautiful edition of the text and translations, and a German pastor has published, within the last fortnight, an admirable monograph of the whole code, in which he takes the line I am trying to argue, and it is of great interest to us all to find that those laws, about which questions of all kinds have been raised, should have been proved to be the Laws of Western Semites in their growth and progress.

There is one point upon which I am inclined to differ from my friend. This enormous monolith, when I saw it in Paris, seemed to be a very difficult stone for even the Elamite king to carry across the country and up to the mountains of Susa. No doubt Cush was actually once a province of the empire of Ḫammurabi, and there were perpetual fights in those provinces. I have written many papers on the struggles of these people, and I believe when Ḫammurabi formed his great empire, extending into the countries of the west and into Palestine, that he also conquered and appropriated the kingdom which was afterwards the seat of the empire of the Elamite Kings, but which during his time was part of his empire, and that this monolith was simply planted in one of the cities of his empire and formed a portion of his own legal enactments, and that it is not a question of the removal of the stone.

It seems to me that nothing can well be more interesting than the description given by the author of this monument. In the British Museum we have by far the largest number of monuments relating to this king. A huge find was made of gods fabled and sacred for the British Museum, and they are being rapidly published. The subject is one that suggests every sort of idea, and I can only say in common with, I am sure, every one in this room, that we are very grateful to my good friend for the admirable account he has given.

Mr. MARTIN ROUSE.—A great deal has been made of this subject in the columns of the *Times*, for instance, as though the Code of Moses were based on it. Sir Henry Howorth says it is not to be wondered at that they should contain many points of similarity. But I beg, with all deference, to dissent from his conclusion that the law of Moses is to be regarded as having been developed from these other codes. No doubt all that existed and was practically good, was left unchanged, but in the review that was given in the *Times*, there are a number of features that are claimed to show a likeness, but which show a very distinct difference between the codes. For instance, it is possible that if an ox gored a man to death, and it was not known beforehand that the ox was spiteful, there was to be no compensation by the Code of Ḫammurabi. With greater justice the Scripture says the ox shall be slain, and his flesh shall not be eaten; that is to say, a dangerous animal was not to be allowed to exist, and the owner was to suffer the loss of the ox, whereas according to the Babylonian Law there was no provision of the kind.

Again, when men are striving one with another, and one wounds the other, the Code of Ḫammurabi simply says the doctor's bill is to be paid. The Bible adds that the offender shall pay for the loss of time for the one that suffered the injury. Again we see the Mosaic Law is the more just. We are told in the account that Dr. Pinches gave, that many of the thieves were punished with a thirty-fold penalty. There is nothing of the kind in Scripture, five-fold I think is the highest that is paid, and no distinction is made whether the theft is from a common man or from a palace. Again, is there anything like the cruelty and injustice of burning a woman who takes to the trade of a wine merchant, because she happens to be of high rank? Or again, of drowning a woman (which was not

mentioned to-day), or being divorced from her husband (this was quoted from the *Times* review), she might be drowned at the pleasure of her husband. On these points one can but condemn such codes. There is nothing of the kind in the Mosaic Law. Those ordeals do not exist. Again, Dr. Pinches showed that the laws of Ḫammurabi shed light on the custom of taking a second wife when the first wife was childless, and that a man might, if he chose, divorce his wife if she bore him no child. Certainly this was not laid down in the Law of Moses. Again, on behalf of the Bible story of Hagar, I would say in reply to Dr. Pinches that Abraham did not drive out Hagar to perish, or with any thought that she would perish, any more than when he made the attempt to sacrifice Isaac, for we read in the Old Testament he believed that he would be raised from the dead, and if we did not read it, God had already promised that through Isaac all nations should be blessed, and therefore, of course, he believed Isaac would be raised from the dead; and those who declaim on the nature of human sacrifice utterly shut their eyes to the plain teaching of Scripture. Hagar was not driven out to perish, for it had distinctly been told Abraham that Ishmael would become a great nation. There is, therefore, a very striking difference between the account that we have of Ḫammurabi, and that given in the pages of the Bible of the Code of Moses. Perhaps Dr. Pinches can supply the hiatus.

Rev. S. STEPHAN (who was not audible from where he spoke) was understood to say, in referring to the treatment of diseases in the East, that in most parts of Assyria the cure of certain diseases was almost entirely left to women. They gained the confidence of the people. They treated those diseases with compounds of which they kept the secret. In the case of disease of the eye they put the patient on the ground, with his head turned towards them, and held the head fast while they applied their compounds, which generally caused tremendous pain. He was brought once to undergo that treatment, but the pain was so great that he only allowed it to be applied to one eye.

Rev. JOHN TUCKWELL.—I should like to say a few words on this paper, which has so many points of interest upon which one might speak for a long time. What has struck me, however, is that the old idea that writing and civilization and legal enactments and legislation for nations, of a somewhat advanced character, are

comparatively modern, is completely destroyed. I do not think that even the most eminent Assyriologist would dispute that. It is thought that decisions were served out by the Judges by mere precedent. Now it is evident the Code of Ḫammurabi shows something considerably more in advance of that and, as Sir Henry Howorth well said, it indicates a long period of civilization before this code could have been drawn up. I think the temerity of that form of criticism which desires to show that all Mosaic legislation is so modern is completely knocked on the head. It ought to be remembered that Abraham's nationality was Babylonian. He was a wealthy and cultivated man, no doubt, and would hand on to succeeding generations all the enlightenment he possessed, and when Moses came to legislate for the children of Israel, as I take it, we may go back to the belief, notwithstanding criticism to the contrary, that he wrote the Pentateuch. When, therefore, we find Moses legislating, it is natural that he should incorporate the most enlightened and advanced views of national government that he could obtain from any source whatever, whether from experience or divine revelation. I confess I am surprised that anyone should think that this code does, in the slightest degree, affect the stability of any portion of Holy Scripture. In the New Testament, where you find our Lord referring to some of these enactments, He does not say that they were the enactments of Moses especially. It will be in the recollection of those who are familiar with the New Testament, as I hope we all are, that our Lord uses the words :—"It has been said by those of old time" (Matt. v, 21 *et seq.*), and that phrase occurs over and over again in the course of His Sermon on the Mount. So He does not commit us or Himself, or the legislation, especially to Moses—that enactment, for instance, "An eye for an eye and a tooth for a tooth." I think, therefore, the conclusion we may come to is one of satisfaction, that enables us more fully to understand that Bible that has been the light and comfort of our parents and grandparents before and I suppose is the joy of many of our hearts to-day. (Applause.)

The SECRETARY.—I hold in my hand the very paper that Mr. Tuckwell has referred to by Dr. Pinches entitled "Ḫammurabi's Code of Laws," printed from the *Proceedings of the Society of Biblical Archæology*, November, 1902, showing that he was the first in the field.

I have also a communication from Professor Orchard on the subject of this evening, which I will read.

Professor ORCHARD.—The Laws of Ḫammurabi are undoubtedly remarkable, and bear testimony to a mind of commanding genius. They furnish yet another rebuke to the many rebukes which modern science has been administering to the foolish theory which depicts early man as a developing savage. These laws cannot, however, be seriously put upon anything like the same high level with the divine enactments in the Pentateuch. Ḫammurabi's laws are, in fact, unequal and unjust both in regard to *persons* and in regard to *offences*. A fatal injury done to a girl is punishable, if she is a *gentleman's* daughter, by the death of the delinquent's daughter; but if the injury be done to a *poor man's* daughter, the punishment is merely a fine of half a mina of silver. Anyone injuring a gentleman is to receive a like injury himself, but a simple fine is considered adequate compensation if the person who has been injured is poor. What can be thought of the justice (?) which visits with death such offences as theft, threatening witnesses, or harbouring a runaway slave? What a contrast to the careful graduation of punishment to offence, and the impartial equity, the non-respect of persons, which characterize the Laws of the Pentateuch.

Dr. PINCHES, in reply, said: I will not detain you very long. It is needless to say that I am much obliged to all who have so kindly commented on my papers, and not least, I can assure you, to my very good and learned friend, Sir Henry Howorth; in fact, I look upon him as one of the leading spirits, as it were, of the science of Assyriology in England. He is one who has probably taken more interest in it than anyone else, and I do not regard him as a layman at all. He makes a serious study of these subjects, and what he says I listen to with great respect, for it is always worth noting.

Referring to that matter, I am ready to admit the probability that Ḫammurabi did carry the monument to Elam itself and set it up at Susa. The indications on the monument itself may be misleading. In this case, as in many others, we must not place too much credence and reliance on what may be deduced from the inscriptions.

What Mr. Rouse says is also very interesting; but I do not think it necessary to refer to everything he said in detail. The code of Ḫammurabi, with regard to the ferocious bull of which he speaks, reminds me of what used to be regarded as a kind of dictum or law,

or legal practice, that "Every dog had his first bite free." You could not punish the owner of an animal who did not know that the animal was of a ferocious nature, and of course to destroy that animal seems to me to be a little hard on the possessor, especially when the animal was of value, like an ox, or some creature on his farm. As for those women who were burned alive for going into a wine-house, the enactment applied to devotees of the gods and those living in a cloister (for such it would seem to be), and applies to women who had performed a rite of purification or a religious ceremony carried out with that object. Though the punishment was dreadfully severe, yet perhaps it was hardly worse than the doings of the Middle Ages, when, for simply thinking otherwise than as his judges thought, a man was burned at the stake. It is true, as Mr. Rouse said, the enactments were uncharitable, and I believe there are none of the nature of those charitable ones of the Mosaic Code. I do not know that there is anything charitable by enactment in our English Code. I do not know with what eye that would be looked upon by a judge.

The SECRETARY.—There is the gleaning of corn.

Dr. PINCHES.—That is a custom, but not legalized I think.

It is needless to say that I listened with much pleasure to the remarks of my friend Mr. Stephan. There was a conflict between Ḫammurabi and the Elamites for many years, and it is very likely that at that time Ḫammurabi obtained possession of portions of the country and set up his monument there. That is a point, however, into which I will look and will add a note to my paper if necessary. He says eye diseases are not prevalent, except inflammation, and that was cured by means of herbs. That is a very important point. The diseases of the eye mentioned in the Code of Ḫammurabi were cured by means of the lancet. There is hardly any doubt, I think, of that. The word is composed of two characters, the Semitic pronunciation I do not know, but the first is the character *gir*, which means a short sword or dagger, and could only stand for *lancet*, or some instrument used for surgical purposes. Cataract may not have been so serious in ancient times, and it may be that it was more frequent in Babylonia than in Assyria. That is a point on which I know nothing, but upon which probably Mr. Stephan knows something—I mean whether cataract is more prevalent in Babylonia than in his native place.

I am much obliged to Mr. Tuckwell also for his kind remarks. I wish I had time to work out all the inscriptions that come to my hands. There are so many of them, but I hope to do a great deal of work in the near future. Like art, study is long and time is short. I think with him that the Bible--the Old Testament—has nothing to fear from the Code of Ḫammurabi. I do not myself think that it can be proved, by any means, that the Laws of Moses were derived from Babylonia. Every country would naturally have its own code of laws, and that they should borrow from one another is conceivable and quite natural. That has been done constantly. Every country has laws that seem to the legislature of that country to be most suitable for it, and so with Assyria, the Holy Land, and the nations around.

A vote of thanks to the author having been carried, the meeting adjourned.

ORDINARY GENERAL MEETING.*

COL. MACKINLAY IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed.

The following candidates were elected :—

MEMBER :—Rev. Marmaduke Washington, M.A.

ASSOCIATES :—Henry J. Martyn, Esq.; Richard Denny Urlin, Esq.; Capt. Alexander M. Seton, R.A.; Rev. A. E. Barnes-Lawrence, M.A.; The Hon. and Rev. W. Talbot Rice, M.A.; Professor J. W. Spencer, Ph.D., F.G.S.; Rev. William Fisher, M.A.

The CHAIRMAN.—Our Secretary will give you a few words of introduction.

The SECRETARY (Professor EDWARD HULL).—Mr. Chairman, ladies and gentlemen, I think it is right that I should state how it came that my valued friend, the Rev. Dr. Frazer, addresses us this evening. He and I are members of the same club, and he is one of those officers of the Church Militant unattached at the present moment to any particular regiment, so that he offers his services where they may be required—his spiritual services; and on occasions he has been out to South Africa as Acting Chaplain to the Forces, carrying with him those spiritual benefits which are necessary to the comfort of our soldiers in the field, or in the hospital; or sometimes by the sadly necessary services over their graves. One evening he began to give me some of his experiences, and they appeared to me to be so interesting, that I thought it would be of interest and pleasure to the members of the Institute, if he could be induced to give us some of those experiences at one of our ordinary meetings. He very kindly and readily consented to do so, and now I have the pleasure of introducing him to you this evening. [Applause.]

* Monday, May 18th, 1903.

LECTURE ON "EXPERIENCES IN SOUTH AFRICA DURING THE WAR." By the Rev. W. H. FRAZER, D.D., late Acting Chaplain to the Forces.

LAST year my friend Professor Hull asked me to give an account of my experiences, or some of them. We were then on the very tip-toe of expectation—the war was existing, and we know how our pulses throbbed day by day with regard to news from the seat of war. That state of things happily has discontinued. "Grim visaged war hath smoothed his wrinkled front," and now we are about to reap the benefit—benefit even from a terrible war; and I feel that although the subject may be somewhat tame, owing to the many books that have been written upon it, still there are hearts to whom the experiences that they have had in doing their little duty for others' sake are very dear, and which they treasure most thoroughly and will never part with while they live.

Now, ladies and gentlemen, although I am asked to speak about the war in South Africa, I claim that my experiences of the front commenced at home. I was Acting Chaplain in Woolwich. I had previously been at Aldershot. A quarter of a century ago I commenced my work with the soldiers, and I was brought face to face with the front on the occasion of a first batch of 164 invalided men sent to the Herbert Hospital for care and ministration. One's heart naturally throbbed with sympathy on this first appearance of these gallant heroes, who had fought and bled for their country, and I remember how anxiously I wended my way up the hill, and thought how I might speak words showing my sympathy with their sorrows, their sadnesses and sufferings; but I was astonished to find, when I got into their midst, that I was about the only saddened soul there. I found they were all joyous and happy, and then, after experience amongst them, visiting them and talking with them, I came to the conclusion that it was a remarkable fact in human history, that those lads who were brought from the humble positions they had been taken from to fight, and who had fallen, and were mutilated for life, were nevertheless proud of their positions, and one grumbling word did I never hear from the mouth of any with regard to his misfortunes. [Hear! hear!] It was a glorious fact—it was an opening up of my own mind to many a revelation of the deep things hidden within the hearts of men, no matter what their grade might be in life. The war fever was abroad and I caught it, and said to

myself, "I must go and see more of this business—I must go and see what has made these men what they are." I applied to the War Office to be permitted to go out, and was immediately sent. When it was announced to my friends at Woolwich, officers said, "What a lucky fellow you are," everyone appeared to wish (even though they had wives and families) to get out to the war, and it was a great cause of thankfulness to me that I had succeeded in getting out. During my services I had four trips—two out and two back. I need not go into any of those details with regard to sea-faring life that we note down in our diaries—that has nothing to do with our subject. There are just one or two incidents that I will touch upon. One was, seeing a whale get a good thrashing from a thrasher. I had travelled a good deal about the world, and I had but once seen a thrasher attack a whale.

Another one was, that those boys—those heroic souls that belong to our country and make our hopes satisfactory and firm with regard to it, sung merrily on those evenings on board, when concerts were given, and I marked this, that those whom we would call uncultured youths, full of ignorance, sang their songs with charming beauty, that went to the heart. Our officers would have a concert, too, but "Tommy" beat them hollow. We went from Southampton to Queenstown, and I was glad to tread the ground there, where I had been many years ago, and from thence we sailed to Las Palmas and St. Helena. St. Helena especially is well worthy of notice, and full of memories and history. Then we made our way to Table Bay, when I beheld a sight that I was assured, and I believe, had been until then unequalled in this world, with its 18 or 20 giant troop-ships all clustered there, to carry to and fro hundreds of thousands of men and weighty munitions of war.

When I got ashore at Capetown I had to report myself to some superior officer. He was very nice, but he was rough in his manner, and gave it to me hot. The next day he was good enough to ask me to forgive him. "It was that unfortunate temper of his," he said, "that Irish temper." I said, "Nothing of the sort. Irishmen have the best of tempers, especially when they are educated and cultured men;" but I was bound to forgive him, and I did.

I was next, to my great surprise and regret, ordered home in charge of troops. I often think of the pleasure of those journeys, and how our soldiers valued the services of religion, and it was a pleasure to me to go back again even for that very purpose. I had opportunities during my stay in Cape Town of

visiting the camps and holding services in them, visiting the Boer and English hospitals, and holding services in them also. On my way home I found that the men were suffering from a great want, namely, of literature—something for them to read. The discomfort and unhealthiness of my cabin caused me to complain bitterly on arrival at the War Office, and to the owners of the ship. I was just a week at home, and off again on another ship. Having found the great want that was experienced of literature for "Tommy Atkins," I put a few letters in the newspapers, begging for some papers, books, and magazines. This happened on a Monday. I asked to have them on Tuesday evening in Southampton, as our ship would sail on Wednesday morning. When I got to Southampton, to my great surprise, I found there was an immense quantity of literature, up-to-date—two waggons full. I had thought I might get a good bundle that I could lay aside and open at my leisure, but found that two waggons from the Post Office had come, and I found also another waggon from the railway; so there was a good supply this time, and it was pleasant for me to read a few of the pretty letters that some of those kind people wrote. Many of them thought that I was sure to meet their relatives, and I was to say to each one of them what they wished. It was very natural, but I was afraid I could not be in so many places at the same time, and I gave it up; but of course I did put a notice in the papers thanking those who had contributed. Then I got into Cape Town, and reported myself, and I was asked to join the 19th Brigade in the north-east of the Transvaal. The commander was then chasing De Wet. I said I would catch him if I could.

On advice, however, I withdrew my name and ardour to go to the front to chase De Wet. I was then asked to go to De Aar, a station where I should not be lying on the veldt all night with but a blanket to cover me; so I went there. The only thing that struck me on the way up country was what is called the Karoo Bush. It is a beautiful country around Cape Town for about one hundred miles out, where the Karoo country commences, and if you have not been there, you may wish to know what it is like. The Karoo Bush is a shrub on which all cattle, horses, sheep, and goats are fed—a small bush from 6 inches high to about 18 inches. It covers the whole of the ground. But it is a desolate country, and passing through in winter, we find the shrubs turned quite black, and the country looking horrid. I saw it first when it was the very worst time of the year. It was not so bad afterwards, when the bushes

bloomed. As you go on you see very few houses. The truth is, every Dutchman and every Boer when he gets into a farmstead is never so happy as when he can look round and see no other human habitation. He wishes to be monarch of all he surveys. It is a peculiar sentiment, but it is there. When I got up to De Aar, I was ordered to extend my labours. There were not many soldiers in De Aar, and it was so quiet that I thought there would be there nothing of the war worth seeing; but it turned out afterwards to be one of the hottest spots of the whole campaigning ground.

My duties were extended from De Aar up to Orange River and Modder River, and afterwards to Jacobsdall in the Orange River Colony. The two first stations are in Cape Colony, and I was put on orders to visit those places every week if possible and give to them as many Sundays as I could. Then I saw before me a great opportunity of learning a good deal that I wished to know. The first thing I learnt was to run along the line of country which a little time before Lord Methuen had followed, showing all the battle fields that were his—at which he fought and conquered—Belmont, Graspan, Enslin, Modder River, and Magersfontein. I made my way up as far as Mafeking. The most interesting place I came to was Magersfontein, six miles across the veldt from the Modder River Station.

I was deeply interested, having read in the newspapers the accounts of that rather unhappy battle. It was there that General Wauchope fell. It was there that the Highland Brigade met with so much loss; and I was glad to see it, because on reading the news that comes from the press, and all those worthy gentlemen who supply us with information in the way of news, you never get a true idea till you go, as I did, to the spot. I found there at a glance how it was that such things happened as they did in that battle, and how it failed. There is a line of entrenched kopjes, and two miles off is the Modder River, and coming out of the end of the kopjes there is an unknown level trench on the level veldt running across to the Modder River. It was a night attack, the troops arrived early before the morning light, and unhappily, not having scouted, they knew nothing whatever about that trench. They were working to get round the kopjes to outflank the Boers, and I saw there 308 dead Boer horses. Our troops were overcome, and had to do what the Highlander ever bravely avoids—they had to retreat in haste. They were fine young fellows leading as the 42nd ever does; but disaster awaited them; all the officers of the corps being shot down, save three, one of them, young Grant,

fought about seven hours, and what I am smiling at, is the frequent regrets that he expressed to me that he had not been wounded. We all know how General Wauchope and others were blamed. There is no war without little and great mishaps. It is absurd for people to say it is a disaster here and a disaster there: it is not a disaster, but an incident of war. By the way, I should have told you of those patient loyal men at the Woolwich Hospital. I will tell you why I talk so highly of them: they came from the Colenso fight, where they were beaten badly, from Spion Kop and Magersfontein. Those men who had suffered so much were the fellows that never grumbled in the slightest, and every man of them that fought under Buller, though defeated, spoke loudly in his praise.

Well, we came to Modder River and Magersfontein, and then I went to Paardeberg; there I saw the deep river banks that are described, with holes in which they found shelter. You know that General Cronje and between 4,000 and 5,000 men surrendered on that occasion. I afterwards saw them in St. Helena, and thought that a much better place for them. I took some good snapshots of Paardeberg and all those battle-fields, Belmont, Graspan, Modder River, Kimberley; and all the way up to Mafeking I picked up all kinds of curios; they are now on my walls, and people come and look at them, and would like to take some of them away; I have always to keep a sharp look out when my friends come to my rooms. I have a large quantity of cartridges from that trench that opposed the Highland Brigade at Magersfontein. I have some remains of the wire fencing that balked them as they came up to this flat and fatal trench. I intended to have got a curio which I picked up from one of the horses that were dead behind a kopje. A lady thought how nice it would be to get one of those horses' hoofs and take it home, and get it mounted as an ink pot. I saw one almost severed from the leg, and I wrenched it off, and walked away with it; when the atmosphere became very unpleasant. I said, "Be a man now, and face it—stick to it, and don't give it up," but I had to give it up, and I ran as fast as I could, and left it. I felt that it would be better to be a coward for a minute, than a dead man for the remainder of my life. At Paardeberg I was more successful in collecting curios. I got a large number of Boer stirrups, and the nurses at the hospitals liked to have curios from Paardeberg. I asked, "Would you care to have a stirrup?" "Oh! yes, should be delighted," and I gave to several of them a stirrup.

I came on to Mafeking; it was after the siege had been

raised; it was well worth seeing. There again was a battle-field, or the place where a great military struggle was carried on, and that unfortified flat town was left with 600 brave men to defend it against from 6,000 to 9,000 Boers under Cronje. I have a good many curios from there, and many pieces of very large guns, which also are coveted by my friends.

I found one very strange thing there, viz., that the very man who was thought so much of (and they did marvellous things in defending that town), I found very unpopular with the inhabitants, I refer to Baden-Powell. Several men who came from there only the other day, said they were astonished to find the feeling that existed there against him. They said the great favourite there was one of his staff officers, and the reason of his unpopularity was, their having "short commons" for so long a time. Having got south from Mafeking, after a little I went on my weekly excursions. I had to go about 300 miles every week. I held services at four different stations, commencing them sometimes at 5.30 a.m. This was not my choice, but what the men and their officers liked. At times the men would be in the trenches all night, and come thence at the first opportunity to worship God. On one of those occasions a terrible disaster overtook the men who were encamped at Jacobsdall, when they were surrounded and butchered.

I have been taught by my experience in South Africa, that the Boers have a great regard for clergymen, therefore I preferred a Cape cart to an armed escort, which provoked sniping. I met Mr. De Waal, of the Cape Parliament, whose name constantly appears in the papers as the Secretary of the Africander Bond, and I was very glad to meet him. He is an intelligent man, and spoke English well. He is a Hollander, and lived for many years in the United States. He spoke of English rule as the most glorious that subjects could live under. He spoke of his own people—that they are truly religious. But I said, "What about white flags to allure the British soldier into houses and other traps to have them shot down?" He said, "I am not going to defend everything they do, but you will find they have every respect for clergymen," and so I found it.

The most remarkable thing I found about our young soldiers was this—they had no fear of death. They had never grumbled over any hardship they had to endure—there was never any complaint, and I could not believe that men could

be got in this wide world to care so little for life as they did when called on in parties to draw the enemies' fire. All they wanted to do was their duty, and to be thorough men, and they were. I had to go many miles, and had risks to run every day, and the conviction came on myself when fear was utterly banished. There would be in travelling by rail, risk of their blowing up the line or the train. We were frequently attended by armour trains going in front pioneering other trains. There was an important battle fought by these trains, and I came in at the end of it. The Boers were making a dash down into Cape Colony under De Wet and Stein. Plumer had fought them first at Sandrift, and for two or three days across the country. An armour train happened to come in sight of them, and knew nothing about the events that had been going on. We wired for more armour trains to come, and about 10 p.m., when all had arrived, there was an explosion, showing that the line was blown up. We had to wait until the morning to investigate, before we could move trains. When the light did come, the Boer forces of several thousands had crossed the line, but all their wagons, thirty-four of them, they had to leave behind, and we got them. However, in fifteen minutes our men had another rail down and trains were passing over it. One train had two twelve-pounders. They fought and turned over some of the Boers as they fled. We however had to be contented with their thirty-four waggons, and some Cape carts and one maxim. Their red-cross waggon was found full of ammunition.

When I visited the hospitals I found the behaviour and tender-heartedness of our "Tommys" amazing; they were ever ready to assist the nurses or their brothers in warfare. They were as kind and as tender as women. (Applause.) It is a pleasure to me to be able to testify to this; and as to the medical officers, no more splendid behaviour and great devotion could be expected of them, their nurses, and staffs.

Scotsmen are proverbially clannish, I found that out in hospital experience. A Scotch doctor said to one of his countrymen, "Well, mon, I am glad you have come here, because I can always be kind to you. You have only to ask me for anything you want, and I will get it." "Well, doctor, it is very good of you," said the man, "I will just ask a trifle, and that is, can you get me a glass of whisky?" "Oh!" said the doctor, "I am so sorry, because we have run short of whisky. We have only a short supply, and none is given except to those patients for whom it is ordered; but as soon as a fresh supply comes in, I will

not forget you." "You are a good doctor," said the man. "Is there anything else I can do for you?" said the doctor. "Well, if you would come in and talk with me like this two or three times a day, and sit where you are now, I should be glad, because your breath is so nice and comforting." There is an implication here.

A little incident occurred to me when I was going my rounds once. A staff officer at Orange River said, "Can you baptize a Boer baby? There is a loyal Boer and his wife who want to have their baby baptized." I replied, "Certainly; you keep the train here and I will do it." "Oh! your train will be all right," said he, "they don't care a button about stopping a train here for half an hour or an hour." It did not perturb them. They travel at a pace of 12 or 13 miles an hour. I baptized the baby; but what surprised me was that when I asked for the name, the Boer father said, "Victoria." The Queen had been dead about a fortnight, and so I baptized the child with that name. I afterwards thought it a great pity that I did not suggest that the name should have been made to apply to both King and Queen, and that it should have been given the name of Victoria Edwardina.

Looking at the experience I had of the war, and remembering the heroic acts and splendid behaviour of our men, it is a terrible thing to think that any men who, for the love of country, for love of their flag and their King, endured so much, should be allowed to want, to hunger, or to beg; but it is so, not that our Government wishes it, but the Government cannot be everywhere. There are other men—very different altogether—men in petty positions that turn that position to make grand fellows of themselves. They do a deal of harm, and I have seen much of it. I have seen the very best type of men of the line and our militiamen, but there is a great difference between the volunteer officer and the militia officer and linesmen—a wonderful difference. It takes more than a monthly training each year to make good officers. There are also, it struck me, great failings and wrong doing in various ways in the Army. I know of men, for instance, at the present time, who tell me that they have not received their pay, and cannot get it. I know of many cases of that kind. I know a clergyman who cannot get his pay and claims. They tell him he has received all his claims in South Africa; yet he has necessarily and largely spent his own money in performing his duties at the front, and these fellows obstinately refuse to pay him, or to produce the documents pertaining to his claims. I know of a

case of a major in a volunteer corps who could not get his claims paid. His solicitor wrote to Mr. Brodrick, our War Minister, and said, "If you do not pay me this money, I will issue a writ." That was to expose the case, for he could not get judgment on a writ against the Crown; and within 48 hours that money was paid. The other day a clergyman's brother, who had fought in the ranks, told me he could not get his pay, and could not get even a free passage home. There are a good many things of that kind that I might go into and give particulars of, but it would take too much time. I may in another form; for instance, I could give you one point about my own sending in a claim for £37 for lodging allowance. When I came to be paid I was given but £30. I said, "My claim is just £37, and you have a receipt for this amount. What about this receipt?" He said, "I do not know anything about it, that is all you can get." That is how they transacted business at the Cape. Those men ride rough-shod over a gentleman and man of intelligence, and do things that would soon be set right in a police or county court in this country. I do not think of anything further to say, beyond a few words concerning natural objects in Cape Colony. The Karoo country contains herds of spring-buck, ostriches, locusts, and flies. The flies are the greatest pest there, and the most dangerous one; for where they appear, enteric disease spreads with wonderful rapidity. Then there are those extraordinary dust-storms, which commence like a whirlwind. I have been a little distance from them, and have seen the whirling of the wind and the gathering up of the dust—forming a column of great height, which moves along, still gyrating, for a couple of miles, and then it dissipates and disappears. These storms form in full force in an instant, when everyone, when the wind is heard, rushes to close doors and windows (which are ever open in the summer), to keep out the dust-storm. Where I lived mostly I found the climate healthy. It was declared to be climatically the most severe situation in the whole of South African camping ground: that is in De Aar. The summer is extremely hot; but still I had splendid health. It was 106 or 107 degrees in the shade every day for five or six hours, but in my tent it was from 113 to 118: so I could never go into my tent during the day. I got, all through, most excellent health, and the only suffering I had to endure was four or five days of fever and ague.

I have read some of the best books on this subject, and I have observed that the incident I referred to of the battle of the six armoured trains is not referred to by De Wet, who is

credited with the outrage of sjamboking a well known major in one of our cavalry regiments, because he remonstrated with him concerning his cruel treatment of some of our men whom he had made prisoners.

I will not delay you further, but will merely thank you for the attention you have given me. [Applause.]

DISCUSSION.

Mr. MARTIN ROUSE.—I would ask the lecturer a question or two, as no one seems to come forward; whether, in the first place, he believes there is any truth in the charges that were made, especially abroad, regarding the treatment of women and children in the concentration camps.

Dr. FRAZER.—It is a most important question, and I must willingly testify that the shadow of a word to support those charges I have never heard uttered against one of our men. I do not believe that you could find one individual, unworthy of himself as an Englishman, as being party to such crimes as were charged against them. I have watched keenly, and I have asked others who have had opportunities as widespread there as mine, and they have never found a shadow of foundation for it. [Applause.]

Mr. MARTIN ROUSE.—I would ask the lecturer whether he saw much of the work of the South African General Mission, in which I am particularly interested; as to whether they went to the front and worked amongst the men, and so on. I should like him to tell us, if he can, some of his experiences, if it is not too late, of the cheer and comfort that he has been able to give to dying men, and his account of any change that has come over the heart and life of men through his own ministry.

Dr. FRAZER.—Oh yes; God uses humble beings towards great ends. He knows how much good has been done. I know that it was very satisfactory, the experience that I had in my ministry. With regard to the natives, the missioners go in amongst them. I had no opportunity of forming an opinion, but this I do know, that the Bishop of Grahamstown spoke to me most approvingly of a service he had attended of Kaffirs close to my station. Unfortunately every Sunday when they met for worship I could not attend.

He said, more reverence in the house of God he never experienced. He declared that many of those people put ours to shame in their realization of the Divine Presence in their lives, and the reverence and holy fear evidenced in their worship. I am very hopeful about it, and I see in every way a great future for South Africa—commercial future and spiritual future. I am persuaded that the work has begun well and that it will go on. [Applause.]

The CHAIRMAN.—Dr. Frazer has done very good work in bringing before us the army at this time. At one period the army was regarded as entirely distinct from the people; but that time has rather passed over; now the army is more in touch with the rest of the population. Dr. Frazer has mentioned the good conduct and feeling of the soldiers, and I think that is very important to remember, and I think it will be found that the conduct of the soldiers has had a great deal to do with the happy settling down that has gone on. There is no ill feeling, as far as I know, between English soldiers; on the contrary, there has always been kindness and good feeling shown when they are in hospital or at any other time they have met. What is that due to? Very much, I believe, to the spread of the Gospel in the army. Now, as we know, many efforts are made, and soldiers are not all the dissolute, idle and corrupt people one was accustomed to think about; but their whole tone is better, and some are earnest Christian men. I remember a colonel in the "Black Watch" telling me that he thought that there was no place where a Christian man could be so useful as in the army. I know of the Soldiers' Christian Association, which is very largely developed in the army, and all of us can help a very great work in the army by praying for them, by coming into touch with them, and remembering them and looking after them on furlough; by speaking kindly to them, and helping them so that they may be more and more brought out in the future.

We all join in thanking the lecturer for the information he has given us this afternoon. [Applause.]

Dr. FRAZER.—I only wish once more to assure you of the great pleasure it has given me to come here and to tell you these few experiences. [Applause.]

The meeting then terminated.

ORDINARY GENERAL MEETING.*

REV. G. F. WHIDBORNE, M.A., F.G.S., IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed and the following election took place :—

ASSOCIATE :—William Warry, Esq., M.A. (Oxon.).

The following paper was then read :—

THE LIVING GOD OF LIVING NATURE FROM THE SCIENCE SIDE. By Professor LIONEL S. BEALE, F.R.C.P., F.R.S.

BEFORE reading the paper I should like to make an observation particularly with regard to the point that of all the broad questions left for us to consider, and I trust to determine, bearing upon the most important principles open to human knowledge and investigation, is the one which I venture to lay before you of the relation between living and lifeless matter. The difference between the extreme opinions with regard to the relation of life to matter is now most extraordinary. Many observers and thinkers insist that living things and lifeless things all belong to one category, while others believe that the distinction between life and non-life is simply absolute: that there is no relation at all between matter that is alive and matter that is not alive; that they are quite distinct, and that life depends, as far as it has yet been reached, not upon any

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* Tuesday, June 2nd, 1903.

forces of non-living nature, but upon the Almighty; that there is not a particle of living matter of any kind which can be explained, except on the view that it depends upon God.

The matter of the body of everything that lives in this world consists in part only of matter which is actually alive; the greater part being composed of matter which *has been* alive, but which as structure has ceased to live—matter which in fact has been formed *from* and *by* matter which at the time was alive; this being the only way in which structure and formed matters belonging to a living organism and endowed with characteristic properties or structure, can be produced.

The *living matter* consists of innumerable minute particles, Bioplasts, to be seen in the tissues and organs of man and the higher animals, varying in size and proximity to one another in different species, but present in all. At an early period of development, in all classes and kinds of complex organisms, the embryo consists almost entirely of particles of living matter, indistinguishable from each other, each of which, as development proceeds, may form on its surface a thin layer of delicate tissue, and this may increase *layer within layer*, until each particle appears separated from its neighbours by a considerable thickness of tissue which, as it has been *formed*, has ceased to live. As age advances, the proportion of this last increases, and the living particle within diminishes in size. In old age the living particles in the tissues become very small.

Allow me to say that these observations depend entirely upon what one is able to make out by using the microscope. Nothing that I have just referred to can be seen without comparatively high powers of the microscope.

All the matter that is alive, and at every period of its existence, contains a large proportion of water—water being absolutely necessary to every kind of living matter or bioplasm, that lives in this world as long as its life shall last. And there is no doubt that water was present in every particle of matter that lived in past time, even from the creation of life, when "the spirit of God moved upon the face of the waters." The nature of life power is unknown, but there is no property of matter, no force, no factor, with which it is comparable. Distinct from all physical agencies, *vital motion* is not in the slightest degree affected by gravitation.

The division and sub-division of many particles of living matter, all through living nature, into very minute, separate, and growing living particles, is a fact of the highest importance as regards the question of the nature of life. Seen in the micro-

scope as innumerable separate particles easily destroyed, and varying in size from extreme minuteness, to particles generally measuring not more than the one two-thousandth of an inch in diameter. These living bioplasts, besides being very numerous in all growing tissues and organs, are present in very large numbers in many of the fluids of the body, especially in the blood, lymph and chyle, and in milk, at an early stage of its formation. In the *interstitial fluid* which slowly circulates in all the minute interstices of the tissues, distributing nutrient matter in solution, and receiving also in solution substances resulting from the action and death of living matter, minute particles of living matter also exist. All through the living world, every living particle has been derived from a living particle which lived before it, and each one may give rise to numerous living particles which may succeed.

No one can tell from any given particle of living matter what will be the structure, or what the properties or composition of the tissues and substances to be formed by it; not even the chemical composition of the lifeless compounds which result from the death of any particular bioplast can be ascertained. Such is the origin, and the earliest stage of all living matter at this time and I think I may say, has been so generation after generation from the very beginning.

Every living particle in nature as long as it lives contains water, which, if much reduced in quantity, would cause the death of the living matter; and death would occur long before a living particle became nearly dry. Some living particles and many *Protozoa* consist almost entirely of water. This moist Bioplasm or living matter possesses in its substance the power of *movement within itself, and in every direction*—movements, vital, inscrutable, inimitable, but to be seen and studied in many instances as long as the right proportion of water is present.

No living particle of matter can be chemically analysed: for any attempt to do so would cause its death, and then we should be dealing, not with the living matter itself, but only with various kinds of lifeless matter—chemical substances formed at and after its death. Form, colour, composition do not help us in any way to explain or account for the nature of living matter. Indeed they are, as I have remarked, but results of its death. Their character, properties and composition depend upon the vital changes effected by the life power while the matter lived.

In the tissues and organs of fully formed living animals and

plants, the minute particles of living matter alternate with non-living matter or tissue, which has been formed from and by the living matter, but which in the state of tissue or structure of any kind does not *live.*

This distinction between the living and non-living matter of everything in nature, is absolute; and when we say an organism has ceased to live, or is dead, to be accurate—we should rather say, *the once living matter is dead.* The tissue or structure died when it was formed, and was as dead while it remained in the living body, as it would have been if the whole organism had ceased to live.

Such structures in fully formed organisms, as hair, feathers, horn, nail, much of the tooth structure, the greater part of the ivory of the adult elephant's tusk, for instance, are lifeless, though they may have been firmly fixed to the living body for years, and, indirectly, may be of great importance to life. All these dry and lifeless structures were moist when formed by the moist living bioplasm or living matter.

A sharp line of distinction must therefore in all cases be drawn between the living and non-living parts of every living organism in nature. But it must be borne in mind that all the tissues, and all the non-living formed matter of every organism, was first in the state of living matter.

Of the precise nature of the life-power of living matter, little has yet been ascertained. The power, it must be admitted, belongs to life itself, and originated in previous living matter. I think we must place life-power, if not among spiritual powers, at least consider it as being nearly allied to the spiritual order, and absolutely apart from all physical *properties, forces, energies,* or *factors* of matter.

The living particles themselves and their action during life, can I think only be reasonably accounted for by attributing them to vital power, created, sustained, and regulated from the beginning, by the living God.

With regard to *living matter, living growth,* and the *formation of tissue*:—In every department of living nature, at all times, and in all ages, in all developmental processes, a great fact for consideration is the universal presence of a large proportion of water, and the faster the growth proceeds whether in health or disease the greater will be the percentage of water. Some vegetable, as well as animal tissues during the very important and earliest stages of development, may contain for a time more than eighty or ninety per cent. of water, and I think it will be found that all living tissues and organs, and abnormal

growths during the periods of rapid increase, contain nearly as much. I wonder that thoughtful persons have not been impressed with this broad and probably universal fact, especially as Mr. Darwin's evolution hypothesis suggests that all living organisms probably sprang from one or a very few simple life forms, each of course containing much water. If his followers had admitted that, from the beginning to the end of life, the changes in the germ during its development, and every succeeding living particle till its death, were governed by some direct superintending and sustaining life power, the view would I think have been near the truth.

By the study and contemplation of the changes occurring in life and living growth, we may perchance approach nearer to a true conception of the nature of the vital changes governed by infinite Almighty Power, than by directing attention to the overwhelming lifeless cosmic matter and the extreme cold and heat of the Cosmos, infinitely far away from any particle of matter that can possibly live, or move and grow.

In my last paper to the Institute, I alluded to the elaborate structure of the valves of diatoms, as positive evidence of the direct influence of constructive power and agency, which can only be attributed to the infinite living power of Providence, and I feel confident that anyone who will attentively examine a few slides of these beautiful objects in the microscope, will agree with me.

Again, by patiently watching the highly complex movements of the legs of the tiniest insect, or spider, on a summer's day, the thoughtful mind will be convinced by what is observed, of the action of a very elaborate and highly complex nervous system, the general arrangement of which will be as clear to the understanding, as if every part had been microscopically dissected out, and prepared in the most perfect manner for demonstration.

The observer who from long and careful microscopical investigation is aware of the general structure and arrangement of the thin layer of the active grey matter near the surface of the convolutions of the human brain, and has thought over the great number and distribution of the vessels taking part in its blood supply, and who is able to compare this with the corresponding arrangements in other parts of the human body, will mark the provision for the free supply of a large proportion of arterial blood, and will feel satisfied with the evidence afforded of purpose and design. He would infer wonderful activity and very high office of the extensive and elaborate structure, and

the large proportion of very moist living matter which is well known to exist in this part of the brain. This is by far the most important and wonderful part of the human organism. And if he had the knowledge which patient microscopical enquiry into the minute structure of this part of the brain alone can give, and had frequently contemplated his own thinking power and noted the wonderful precision of some of the most delicate and complex of man's voluntary movements (say for example, in drawing, and in playing musical instruments), seated probably in several parts of the cerebral cortex, particularly if he was in good health, and especially after rest, when his mind was clear and active, would I think believe, on this ground alone, in the infinite power of the living God of living nature, unless he had determined under all circumstances, to refuse to admit the existence of what he had seen with his own eyes and was evident to his understanding, and to neglect the inferences which necessarily follow the careful consideration of well demonstrated facts.

Thus at the outset of our enquiry, it appears that the consideration of a few broad general facts connected with many different organisms at various ages, and belonging to different departments of living nature, regarded from the science side only, compel the reason to infer, that all growth and the process of the formation of tissue, like life itself, must be due to powers which are of the living world only, and that all the chemical and physical changes occurring in living nature are brought about and regulated by *vital action—vitality* itself, a power which has not been isolated or made evident by scientific investigation. It seems to me therefore that this power in living matter only, must be admitted to be a special endowment—a power created by God, supported and sustained by Him only.

The life of a part and of the whole of a living body, really depends upon the millions of millions of minute particles of living matter or Bioplasts, in all parts of the moist tissues and organs, these minute particles being generally separated from one another by intervening tissue which has been formed by vital changes occurring on the outer part of the living matter of the bioplast. Thus each bioplast or particle of living matter, becomes separated from its neighbours by tissue of gradually increasing thickness which is permeable to fluid. The living matter of each bioplast by the tendency of its parts to move away from other parts, or *from* a centre, causes fluid to move slowly in the opposite direction, *towards* the living matter. In

this way, each minute bioplast receives its nutrient matter in solution, and any products of action and disintegration of the bioplasm would be dissolved and slowly removed, and at the same time, by the constant movement of fluid in the interstices, the tissue by this slow but steady movement of fluid would be preserved, and its healthy condition ensured. This circulation of fluid, I have spoken of as the "interstitial circulation" because the fluid is constantly moving in the interstices of the tissue. It is a most important system, and indeed exists in organisms not provided with proper organs of circulation, as well as those possessing a special circulating fluid—the blood—which is driven through the vessels by a special pulsating heart or propelling organ.

Let me now ask your attention to an argument of a different kind, which seems to me equally conclusive against placing physical and vital phenomena in the same category—the maintenance of the uniform internal temperature of the body of man and the higher animals, notwithstanding the constant changes in the outside temperature. Many intelligent persons are not aware of this remarkable fact, and of its very great importance to the well-being of the organism, and the serious consequences which may result, if the internal temperature rise only a few degrees above the normal—a change which is not unfrequently followed by serious disease, and in too many instances leads to an early death. By this fact alone the reason of thoughtful persons ought to be convinced, that the physical and chemical changes in man and the higher animals, cannot in any way be compared with those in the physical and chemical laboratory. Only think of the structures concerned, and especially of the arrangement and actions of the nerve and vascular systems engaged in the restoration of the body to its normal condition, after it has been subjected for a few weeks to an internal temperature of but three or four degrees above the normal. Think also of the wonderful heat-regulating powers of the wren, which maintains its normal temperature, probably several degrees above 100, during the coldest weather. Consider its small size, and think also of the physiology of the common little bat of our climate, and study the finest nerve fibres distributed to its vessels, just beneath the epithelial layer of the membraneous part of its wing, one of the most wonderful and beautiful examples of the finest nerve distribution in nature (see *Bioplasm, an Introduction to the Study of Physiology and Medicine*. J. and A. Churchill, pp. 280 to 336, Plates XV to XX).

The physical oneness of the Universe.—The enthusiastic advocates of the adequacy of "Universal Physical Law" to cause and sustain all vital phenomena, do not admit that, during the life of any living growing organism or organ, or of a growing living particle of any structure-forming matter in the life-world, the power at work is distinct and marked off from all matter that is not alive, or that the state of life is absolutely distinct from the state of death, and that of non-life. I hope that ere long some of my contemporaries will consider and discuss this important question.

Will any one of the advocates of the doctrine of the "Physical Oneness of the Universe" maintain that there is no absolute distinction between living and non-living? Can any satisfactory evidence be appealed to in support of the supposed existence of a living organism or a living particle of any kind at this time, in any other world than this? Can the advocates of such purely conjectural ideas support the contention of the existence of any kind of living *being*, of a sidereal nature in any part of the Cosmos? Is it not certain that up to this time, the only living beings of which man has, or can have cognizance and knowledge, are those organisms which like man himself, have been created in, and inhabit this world? Could any ordinary living thing known to us, retain its life for a moment under the conditions now known to exist in any nebula, star, sun, or other celestial body yet discovered? And yet it is not surprising that the wonderfully successful exploration of an immense part of the infinite Cosmos in recent times, should have strongly appealed to the imagination of well informed persons; or, that the contemporaneous revelations of the minute structure and growth of the tissues, and the formation and action of our own organs, and the particles of living matter by which they were formed, should have been little noticed. Infinitesimal details of structure, unseen changes during development and growth, wonderful as these are, cannot as yet compete with the vast and overwhelming grandeur of the material eternal Universe. Astronomy and physical investigation generally, have advanced during the past century in greater degree than other departments of natural knowledge. The same remark applies to all departments of physics and chemistry—and no wonder people have been led to expect that some great physical generalization concerning all matter—living and not living—was about to enlighten the world, and the discovery of some universal physical law, equally applicable to living and non-living, lead to the revelation of the real *cause*

of all nature, at last to be understood by mankind—making it clear how the living comes from the non-living—both being directed, governed, and sustained, by the same universal physical laws. Unfortunately, however, the idea of "The Physical Oneness of the Universe," can only apply to the *infinite non-living part thereof.* So far from the operation of physical law having been proved in anything that lives, the doctrine, as I have shown, is not supported by any one fact characteristic of *life.* No thinker who has studied the facts of life and growth in any one living thing, or the process of tissue formation, as it may be investigated in the animal or vegetable world, will admit that the dogma of the "Physical Oneness of the Universe," is applicable *to any kind or state of life.* He who holds this dogma to be true, must have concentrated his thoughts on that vast part of the Universe, *which is and must ever be absolutely devoid of all life.*

The Telescope, designed and constructed in the early days of modern scientific discovery and progress, improved and still improving, has gradually brought nearer and nearer to the comprehension of man, some of the inexhaustible wonders of the lifeless celestial orbs, and the results of the operation of the universal law, by which their never-ceasing movements are governed. There is no evidence that these vast aggregates of lifeless material atoms, have ever been for a moment through the ages, the seat of one spark of life, or of the movements of one single living particle. Can we suppose that any living thing known to us here, could approach within thousands of miles of the nearest of them? Has not the successful investigation of the external part of many, proved the presence of some of the most refractory substances known, being in a state of vapour at a temperature, which we of this world are unable to realize? Must not many, if not all, of these colossal collections of inorganic matter be destitute of water, in which case nothing which can in any way compare with one single form of life known to us, could possibly exist in those remote regions so far removed from any means we possess of their minute investigation?

The more minutely and successfully physical investigation can be carried out, the more widely will physical phenomena be shown to be separated from every vital change or action. Physical and vital changes are, and must ever be, as the poles asunder. Between the movements of living matter, and those of lifeless matter of any kind, there is no analogy.

For little more than fifty years has the study of the minute

changes in living matter been rendered possible by great improvements in our means of investigation, by which results of great interest to all intelligent persons, have been obtained, and broad general scientific principles of importance with reference to vital action all through living nature, established, the application of which to our life world is not yet realized by the public.

To prove the exercise of Infinite Power as contrasted with the operation of physical law, or of physical and chemical properties of matter, one has but to examine under the microscope the living matter of the germ of a living organism, at an early period of its development—the very young leaves of a leaf bud or petals of a flower bud, or to study the germination of a common mustard or other seed in a thin layer of water, or the vital movements to be seen in a particle of the living matter of blood, mucus, or pus. All attempts to show that the wonderful vital movements of living matter can be included in the physical category, have failed. and must ever fail.

Modern forms of evolution, and evolution by law, as advocated by some, seem to be a progressive experimental process, perhaps never to be completed—inasmuch as some of the evolved soon die, while others having been created "more fit," are supposed to have survived in the so-called struggle for life, and the progeny of the latter, it is concluded, would continue to improve and advance, generation after generation, without ceasing.

By some, living nature would seem to be looked upon as a vast well-found laboratory, or as an elaborate machine in which experimental creation was always proceeding of its own accord, without any power corresponding to human intelligence, direction, or power.

The great "laboratory of nature" is supposed to contain abundance of the ingredients entering into the composition of the bodies of the living things about to be formed, or the means of producing them spontaneously; there being in this great natural laboratory no professor or assistants, the substances necessary must have the power of taking up their proper positions, of arranging themselves, and of moving towards one another in the exact proportions; so that when the atoms come within the spheres of their mutual attraction, they may combine to form the required chemical compounds. The physical forces, or the forces denominated *vital*, then manifest themselves, and the living properties of the new atomic aggregations develope.

The Professor of Physics of Tufts College, Massachusetts, does not hesitate to suggest that when "chemists shall be able to

form the substance 'Protoplasm,' it will possess all the properties it is now known to have, including *what is called its life, and one ought not to be surprised at its announcement any day.*" (*Matter, Ether and Motion.* Society for Promoting Christian Knowledge, 1899, p. 283.) This book, it is announced is "intended for ordinary readers," on the ground that "it brings all natural phenomena under a few clear principles." The chapter on "Physical Life" in Professor Dolbear's book, seems to me quite inconsistent with belief in any form of living power, above or beyond the properties of lifeless matter, and to be opposed to the idea of the need of the living God in the creation or government of the living world.

Here, is one of the most recent of astronomical discoveries, as recorded by a very confident reviewer and I conclude supporter, of universal physical doctrines, in the last number but one of the *Edinburgh Review* (Jan. 1903, p. 140). I wonder what his scientific countrymen will think of it:—"We may rest assured that our intuitions of truth and beauty far from being peculiar to humanity are shared perhaps in a transcendent degree, by *sidereal beings who know as we know if more surely and clearly, and worship what we worship,* though we may hope with a fuller apprehension of the Eternal Majesty"! (Italics mine.)

It is to be hoped that the Edinburgh reviewer will inform us of the nearest sidereal body which he considers to be the abode of the knowing, thinking sidereal beings he postulates, and tell us whether he inclines to the view, that like us they live, or if they have lived, and died in past time, and what idea he has been able to form of their probable composition, dimensions and weight, the mode and period of their construction, and ultimate destiny.

The Microscope is an instrument of a more humble character, and of capacity far inferior to that of the telescope, being necessarily limited to the investigation of objects of extreme minuteness, and of close proximity to us. It is of more recent invention than the telescope, and is capable of great further improvement. New and better methods of the microscopical investigation of minute details of structure than any we now possess, will probably soon be discovered. We may therefore expect to learn much more than is at present known concerning the wonderful phenomena of life and living growth, in living organisms of all kinds. By the use of the microscope, however, we are now in many instances, able to see into the very substance of living matter, and to study some transparent structures during their formation. In this respect we have an

advantage over the astronomer, who at present is unable to penetrate very far into the substance of any of the immense objects he brings under observation, situated at enormous and unknown distances from his eye.

Many facts of living nature which can only be ascertained by the aid of the microscope, are far more worthy of attention and of very careful study than is generally supposed, on account of their bearing on broad questions connected with all life, including that of man. The results of minute investigation with this instrument have not yet been adequately recognised by science, philosophy or religion, although many profound truths of living nature, have already been elucidated by its aid, which could not possibly have been otherwise made known to us.

The new knowledge connected with cerebral structure and general nerve action, is sufficient to encourage us to pursue enquiry further, and to seek for more exact and definite information. Microscopical research steadily pursued, will enable the observer to distinguish the special work effected by vital power, from all results of physical and chemical change. Thus the separation of the kingdom of life from the non-living cosmos, will become more evident to the mind, and the realm of non-living matter will be distinguished from that of life; and I think, if we use our reason aright, the direct works of God—from any results of force or energy, and the operation of "Universal Physical Law." Is not the microscope to the world of life, of which we ourselves constitute a very important part, what the telescope is to the non-living universe—the life that is infinitely near us—to non-living matter infinitely distant, and ever unapproachable by us? Are mind and thought, intellect and reasoning, less worthy of contemplation, than lifeless heat and cold, and blind inanimate physical force, by which life may be destroyed at any moment but can never be restored?

Some philosophers seem to have considered that there was a hard and fast line of separation between animals and vegetables, while not a few have been inclined to degrade the latter, and consider them to be near to matter that does not live. But by microscopic investigation, we learn that the lowest living microscopic fungus is as much a member of the life-world as man himself. Everything—every particle that *lives*—is absolutely separate and distinct from every particle of non-living matter. Everywhere in the life-world, the *Vital Factor* which I have defended for half a century, reigns supreme. Living growth, formation and action, entirely and absolutely depend

upon life-power which at present undemonstratable, was derived from already existing life-power.

What happens to, or becomes of the life, when a living particle dies, has never been ascertained. No law explains it. Life comes from life, and it cannot be included among any forces or properties of matter. At death, life leaves matter without passing on to any other matter, or assuming any other form whatever. Life never arises anew. The same matter lives and dies, but the products resulting from its death, cannot be caused to live again, unless they are dissolved, and then taken up by living matter which imparts to them life-power. Life after life, series after series, of organisms have been as it were using and animating the same matter. As age has followed age, millions of different forms of life have animated atoms which die and may be animated over and over again by other living particles. The life, not the matter, is therefore the individual *living* creature or particle, for many of the same atoms may have helped to form the temporary abode of unnumbered individuals, differing widely from one another in nature and power.

I have shown many friends a fortunate preparation of very delicate peripheral nerve-fibres which could be traced without interruption over a considerable area of very thin tissue (young frog's bladder, Mylo-hyoid muscle of green tree frog). My friend sees and traces network after network without a break, and sees the bioplasts connected with the fibres. He admits the continuity of many of the finest fibres with dark bordered nerve fibres. We quite agree as to the facts demonstrated in the specimen. But to get my friend to think of what such a specimen proves, and the mode of its formation, the growth, structure and action of this very small part of the nervous system which he sees, and to get him to consider how nerve-action is performed in the living animal, or say, over the whole surface of the bladder, or of a muscle, seems most difficult. No doubt in thinking over what he has seen, the hard black representations illustrating nerve-distribution in text books on minute anatomy have strongly impressed him, and as well as the hard wire-like pictures of the soft delicate nerves of nature, have rendered it difficult for him to form an idea of the actual nature and importance of the soft moist transparent nerve-tissues and the countless bioplasts he sees. The specimens referred to have been preserved without change since the preparation was first spread out flat in preservative fluid, and ultimately in strong glycerine or syrup, and the excessively thin cover-glass applied, forty or fifty years ago.

Viewed as an isolated preparation its interest can hardly be appreciated, or its meaning clearly understood.

Many of the most important conclusions arrived at by me, on the structure, growth and action of the tissues of man and animals were published in the Transactions of the Royal, and of the Royal Microscopical Society, in my Croonian lecture to the Royal Society, and Lumleian and other lectures at the Royal College of Physicians between 1855–75. A brief account of the principal observations, illustrated with many drawings on wood by myself, will be found in *Bioplasm, an Introduction to Physiology and Medicine*, pp. 345 *et seq.* (J. and A. Churchill, Great Marlborough Street), and in the later editions of *How to work with the Microscope* (Harrison and Sons, Pall Mall).

Unfortunately the results of my work were strongly opposed to the doctrines of life and living growth, generally taught in the schools, and pressed upon the notice of the public, during the time of Darwin, Huxley, and Tyndall, when no one who had been led from his observations to form conclusions different from those advanced by them, could get a patient hearing. And so things have gone on to this time, and Universal Physical Law, the lifeless physics of the entire universe, living as well as non-living, prevail. But physics cannot explain ordinary facts of living nature. Creation by and the dependence of the whole world of life upon God may be denied and ridiculed; but, as is well known, no one has explained from the physical or chemical side, one single case of life or living growth. To get over the difficulty, some authorities, and especially Herbert Spencer, insist, that physical deposition, aggregation, crystallization, and the mere accumulation of solid particles are examples of *growth*, thereby sanctioning the idea of a Godless living world.

By the telescope man has been able to see the wonderful works of God that do *not* live, but were created and completed (?) æons ago, by His Infinite Power, and now, and for ever, will be governed, by His eternal unchanging universal law.

By the microscope, man is enabled to see and form some idea of the design, construction and gradual formation of the wonderful living, ever-changing, growing and multiplying living organisms, which constitute living nature as we know it at this time, and which living nature receives unceasing support, and, as many think, is under the direct supervision of Almighty power which shall never cease. Does not careful minute investigation in all departments of living nature, convince man of God's living presence in every part of the life

world; and is it not certain that further minute investigation and discussion on life, development and growth, will gradually bring the living human intellect nearer to Him?

General conclusions concerning the life of our world.—Evidence which I regard as conclusive, has compelled me to teach during the last half century certain definite principles as regards the nature of life and growth, and of all things living, and things that have lived in time past.

The conclusions referred to are as follows:—

(1) That, the distinction of every kind of life and growth, and the formation of tissue, in all things living—from every kind of non-life—is absolute.

(2) That, there is no evidence in support of the view that any kind of life has proceeded, or has in any way been obtained, from non-life.

(3) That, while it is certain our world must have been formed ages before the appearance of one living particle, there is no evidence justifying the idea of the gradual production of a living organism, from any matter, or combinations of non-living substances.

(4) In several papers published in our Transactions during the past twenty years, and in other works, I have traced the formation of the wonderful structures characteristic of widely different living organisms, from structureless colourless living matter containing invariably a large proportion of water; and have shown that the facts demonstrated lead up to certain general conclusions of great interest to all who desire to understand the nature and progress of developmental phenomena, and the mode of growth of living things in general, as well as of man. The nature of those differences by which the state of life is marked off from every kind of lifeless condition—from inorganic matter—and from the state of death, which occurs only in matter that has lived, has been referred to.

(5) Many arguments have been advanced in support of my contention of the influence of *Vitality*, Vital power, throughout the whole of the life-world known to us, the only life-world of the existence of which we have proof, and, as far as has been proved to exist at this time, the only life-world in the infinite universe, the only life-world yet shown to have been created, governed and sustained by the Almighty. The infinite designing, directing, sustaining power of the eternal living God, as it seems to me, looking from the science side only, must be acknowledged in every kind of living matter and at every period of life.

(6) Can there be any reasonable doubt that life, vital power, vitality, stands alone, a power *per se*, not related to any of the forces, potencies, or properties of any ordinary lifeless matter, and as far as existing evidence justifies us in concluding, in the universe? Whence originally came vital power in living nature, and what becomes of it when it ceases at death, is at this time unknown to science.

(7) But, so far, there is no indication of life ever having been brought within the domain of physical law. Rather does life seem to be a power which I venture to think, will ere long be regarded as allied to, if not to be actually included in, the spiritual order of things.

While it must be fully conceded that the most profound and *almost* universally applicable generalization which ever originated in a human mind was founded upon the fact familiar to everyone, the fall of an apple in autumn, and though it is not surprising that the universal law then discovered, has been supposed to govern all matter in all states and places in every part of the universe, was it likely that the contention that matter in one particular state, living for a short time only in this comparatively infinitesimal portion of the universe of material infinity, should for a moment not only cease to obey, or act contrary to the universally received universal law, but behave as if there was no such law at all? Philosophy and reason alike have at times refused to listen to this fact—that there is one state, in which matter resists and absolutely overcomes the influence of gravitation. That matter in this one state only, might and does move in every conceivable direction, and by virtue of its own inherent power and notwithsta..vert the ordinary tendency of every *lifeless material partic*..ut "Ag..rawn towards, or to be pulled by the weight of li.. if one k..rticles towards the earth, was not conceivable at that ti..gnostic ..power of self-movement being known only in mat..nd all his.. lives, evidently inherited from the living matter from ..stic obs.. came, and this from preceding living matter.

Contemplating broadly the only *living* nature o.. T..hich we have knowledge and experience, can we for one moment agree that life and all living things obey this great "universal" law of gravitation? Do not countless members of the vegetable kingdom by growing away from the earth as long as they live, act contrary to that "universal law"? In this growth are not atoms and particles of matter moved, and somehow piled up one above the other, against their natural tendency to be moved

towards the ground? And are not living organisms out of number able to overcome this law in flight, and by the ordinary movements of their limbs in raising parts or the whole of their bodies, from the ground by the action of their *soft moist nerves and muscles, and the power* of the bioplasm of these tissues? Indeed is it not a fact that *all* living organisms overcome gravitation? And in short, is there a living particle in our life-world which *in all its parts obeys this law*? Are we not therefore compelled to recognize in these facts the influence of a power distinct from all the forces, properties and qualities of every kind of matter that does not live—a power which characterizes only matter which is alive, but which ceases when life ceases? *Vital* and *physical* are opposed. If physical actions and physical laws and properties were not overcome by *Life-power*, *Vitality*, there would be no life.

RELIGIO VITÆ, RELIGIO SCIENTIÆ, RELIGIO MEDICI.
REGNUM VITÆ, REGNUM DEI.

DISCUSSION.

The CHAIRMAN.—Ladies and gentlemen, I am sure we must be deeply grateful to the Professor for giving us such, if I may use the word, an eloquent paper in every sense of the word, eloquent not [illegible] in the words in which it is expressed, but the depths of thoug[illegible] the forcible truths that it enunciates.

Be[illegible] any further the Secretary will read some communication[illegible] have been received. Perhaps I might first put a formal [illegible] thanks.

[Put[illegible] ied unanimously.]

The [illegible]MAN.—There are one or two questions I should like to ask [illegible] Professor, but I should like first to express my own personal gratitude for many thoughts which it seems to me are hardly to be taken in all at once, but to be well thought over and to form the ground of suggestion of further thoughts. As one reads the paper through, every now and then in what appeared to be a casual sentence, there seemed to be wrapped up a most striking root thought, which I am sure we shall be very wise if we try to

cultivate for ourselves. One thing on the first page struck me as being remarkable, where the Professor points out the multiplicity of living particles that go to form, if I understand aright, one life—that one life is composed of a multitude of little lives. I cannot help thinking that there is a great deal of truth in that thought.

Professor BEALE.—They all come from one original one.

The CHAIRMAN.—Then with regard to the passage where the Professor points out that water is essential to life I would ask a question, which I know how he will answer of course, is there a living particle in a dry seed, a seed that appears to be dry? I think perhaps he might tell us something very interesting about that. What seems to come out rather strikingly when we read that "the tissue or structure died when it was formed" in the new body, and yet went on I suppose to be carried on in that new body, is the old *Mors janua vitæ* view of forces. I was also struck with the thought that vitality has both living products and dead products. If I understand aright the living particles produce on the one side dead bodies and on the other side new living particles. Might it be that the form of life which we think of as spiritual or the resurrection life may be that in which the products will all be living, and that that may explain many of those points with regard to the scriptural idea of the resurrection life where there is an ascendance over the laws of matter?

Professor BEALE.—If I may reply to the last question first, it seems to me when any actual living particle dies it is impossible to suggest what becomes of the life that is gone. Where it has gone it is impossible to say. It ceases; it does not become converted into force as has been said. There has been a remark about "Agnostic." "Agnostic" is used in two very different senses—as if one knew not at all, and also as if one was not certain. The Agnostic has said distinctly and many times that man is a machine and all his actions are mechanical. Now that seems to me not an Agnostic observation, it is a very positive affirmation that man is a machine. The answer to that is that man is not a machine, and not one of his actions is mechanical. There are no mechanics at all in living things. That is the point. But it is said your brain and muscles move—they live. That is true, but the part of matter that forms a great part of the brain is not living matter at all. It cannot reproduce itself, whereas all living matter can. Many would say that the bark of the living

tree belongs to the living tree and therefore it is living. It is nothing of the sort. The bark is dead while the tree is alive, like our nails and the horns of animals, and so on, and the same with our hair. It is ridiculous to say that the hair is alive as long as it is connected with the head, or else the use of a pair of scissors makes the difference between life and death. No one has defined the difference between life and death; that has to be done. What I hope is that we may have discussions about this. It is impossible to get on without discussion. Many of us, I am quite sure, are quite ready to answer any question that may be proposed as well as we can, and then those present will be able to judge for themselves whether our answer is sufficient or not. We shall not get much further with this, although there has been a wonderful advance during the last month, since May 2nd, when Lord Kelvin's paper was read, and now on June 2nd we get very satisfactory information that an advance has been made.

The SECRETARY.—Yes, I think there has been a movement in the direction of belief in an almighty governing and guiding Power.

Professor BEALE.—Very strongly, and all I regret is that the proprietors and editor of *The Times* were not present just to hear what we had to say.

Mr. MARTIN ROUSE.—I should like to ask Professor Beale whether he has observed that the living particles in a particular portion of an animal increase in number and size as the animal continues to grow?

Professor BEALE.—Yes, during the early period of life.* The fact is life goes on and out in the lower animals much more than in the higher.

Mr. ROUSE.—May I take it when you say that living matter is not under the influence of gravitation you mean the life particles are not, because the animal taken as a whole of course is, but the living particles resist gravitation?

Professor BEALE.—Yes, but the animal's structure is dead.

Mr. ROUSE.—Might the permanent structure then cease to live?

Professor BEALE.—Yes; it is not only the external parts of our body, such as the outer layers of the cuticle, the hair and the greater part of the teeth, that are dead, but the fibrous tissue is

dead. For instance, the tendons are dead. The point is this, that if you take the growing part of the skin, even of an old man, if you cut off the outer dry part and come to the lower part, take a very thin layer and transfer it to the surface of another individual which has been properly prepared to receive it, it grows. Therefore it seems to me, the test as to life or not is, if matter is living it will grow. Non-living matter will certainly not grow, and the word growth comprehends wonderful changes. Nothing can be used for growth—for increase in living things unless it is dissolved. All the matter, all the atoms must be dissolved in water somehow before they can be appropriated and grow.

Mr. ROUSE.—When you speak of the matter being absolutely dead you mean it has no living particles within it?

Professor BEALE.—No living power.

Mr. ROUSE.—The cell walls of it are dead?

Professor BEALE.—The cell walls are dead.

Mr. ROUSE.—But the cell substance then is alive?

Professor BEALE.—Yes.

The SECRETARY.—There is one point on this, and the previous discussion which has occurred to my mind as a mistaken idea about life which I wish to just state with due deference. Professor Beale has said that when life departs from a body no one knows what becomes of it—you cannot tell what becomes of it—it ceases—as if life was an entity. An entity, if it left the body, we might know something about what becomes of it—it might enter into another combination. But as life is only a condition of existence, it is not an entity and you cannot speak of it as going elsewhere, or disappearing, or entering into any new combination. As the Professor has clearly pointed out, life must come from life, but it means, I apprehend, that one living body has the power of communicating that condition of existence which we call life, but not, as it were, importing into the other body some definite object or entity. I was reading in a weekly paper a recent article on this very subject, and the writer seemed to deal with the question of life as if it was an entity. I said to myself, This seems to me to be an entirely erroneous view; it is not an entity; it is not a substance so to speak; it is a condition. Now I do not know what force that would have with my friend, the Chairman, when he speaks of the question of the resurrection. I have not thought that question out,

but possibly it might have some bearing upon it. The resurrection of the body, or of the spiritual body, would seem to be under that view, not the passage of the life, but the power of the dying and saved individual to transfer into the spiritual body that life which he himself possesses. The whole subject is one, if very vague and indefinite, yet worthy of consideration, and I will just throw out that postulate to Professor Beale.

Professor BEALE.—I should like very much if Professor Hull would join some of us in trying to get some of these matters discussed from the scientific side. I should venture to suggest that life is a power belonging to the order spiritual, and therefore I should not speak of it as a condition.

Brigade Surgeon J. ROBINSON.—I would like to ask whether the "material eternal universe," on p. 275, refers to a past eternity—that there is no creation at all of matter as matter; or whether the eternity here spoken of is a prospective one. In what sense is that eternity to be understood?

Professor BEALE.—Matter in different forms—the cosmos. It is lifeless, absolutely lifeless.

Mr. ROBINSON.—I meant to ask as to calling matter into existence?

Professor BEALE.—I do not say whether it can be changed.

Mr. ROBINSON.—I heard Mrs. Besant lecture at Reading, and on this question she at once, without hesitation, said it was a very stupid idea on my part to conceive that matter was not eternal. Matter, as matter, through its ultimate developments, might be the formation of a cosmos.

Professor BEALE.—May we not do all we can first to make out the nature of the things nearest to us, and then consider those far away afterwards?

Rev. J. TUCKWELL.—I think it is extremely difficult to express what we all feel on this exceedingly useful and suggestive paper. There are one or two points which I think may be wisely emphasised by us in our thinking over the matter. What struck me as being of very great value was what the Professor has called the necessity of supposing that in biological existence, behind and antecedent to it, there must be some designing, some intelligent, some vital force. Now I think if we take that thought and read Professor Beale's paper with it in our minds, it may be of very great service to us.

If I understand Professor Beale, he, as well as Lord Kelvin, suggests that we must suppose—we cannot do without the supposition—that there is a Creator, a designing, thinking mind, determining the action and the products of those different forms of bioplasm. It is the same in our own body. If I understand it, the bioplasm at the root of my nails has in it no different physical properties, so far as can be discovered, from the bioplasm at the root of my ear, both are enriched by the fluid which circulates and conveys nutriment all over my body, and yet in the one case the bioplasm is working night and day and producing matter of one kind, and in the other case it is producing matter of another kind. Surely there is an indication there, above and beyond all we know of physical nature, of a creating, directing force, determining what shall be the product of these different forms of bioplasmic life. I should like also to thank Professor Beale for the suggestion which he has emphasised this afternoon, that there is a great difference between all material forces and products, and the products of what is called by him vitality or vital powers; or to refer once more to Lord Kelvin's letter, Lord Kelvin disavows anything like a confusion between the form of a crystal and the growth of a plant or an animal. The formation of a crystal, he allows, may be described by the expression, "fortuitous concourse of atoms." Those atoms or molecules are drawn together, or precipitated together by the physical forces of nature, and you have the crystal which is piled up by particles *ab extra*; but in the case of a life you have an entirely different condition of things; an entirely different process of form. You have a bioplasm working from within and laying layer upon layer of dead matter inside the cell, and so what is described as dead matter within the cell is thrown out upon the dead matter that is outside, and continually increasing in quantity so that there is no growth without death. It occurred to me that Professor Beale's paper, and especially his reference to that subject, explains what has been felt by some to be a very difficult expression used by our Lord himself. Not very long since I heard an infidel challenge the statement which Christ made, "Except the corn of wheat fall into the ground and die, it abideth alone; but if it die, it bringeth forth much fruit." I think Professor Beale's paper, this afternoon, gives us an explanation of that extremely difficult passage. It shows us that the corn of wheat cannot grow without death. The gelatinous substance then

of the cell has to die in order that the material that builds up the new plant may be formed; and that layer after layer of it may be formed, the process of death has to go on continually. I think if it were only for the light thrown upon that one passage, and the evidence that it is in strict accordance with what we know of scientific biology, Professor Beale's paper would have been valuable beyond expression.

Professor BEALE.—May I appeal to Professor Hull, and may I appeal to my colleagues on the Council to consider whether we must not have a little alteration in some of our arrangements, in order that we may have, now and then, one of these points thoroughly discussed. It seems to me to be quite within the purview of the Institute?

The SECRETARY.—It is not the first time that you have brought this proposal before us, and I think we discussed it at one of the meetings of the Council, and I have thought over it myself. I would wish you, in the first place, to consider that the arrangements for the meetings and discussion of papers have been of long standing. They are the result not only of the arrangements made years ago by the members and associates and the Council of the Institute, but they have been, as it were, confirmed by subsequent use and experience. They are something like the rules which govern the meeting of Parliament, and it is very difficult to introduce additional meetings and discussions without possible disarrangement of the ordinary meetings and discussions, and also adding, perhaps, very largely to the labours of a very small staff, which I hope you will consider. I find, as a matter of fact, as your Secretary, that it takes me all the time that I can spare from other engagements to deal with what we are now doing; and the Council, when they did me the honour of appointing me as Secretary, accepted my statement that I should give the time necessary to conduct the affairs of this Institute as Secretary, provided I was allowed the time for other numerous engagements and duties. You have no idea the amount of labour that getting these papers and discussions through the press involves. I have to read the MSS., correct them and send them through the press; attend to their issue—first the proofs, then the revises, and then ultimately to get them all into the shape for the volume of Transactions. Possibly, if you thought it worth while to have a couple of meetings thrown in, which would not involve either

printing or reporting, there might be no difficulty, but I doubt much if they would be of much use.

The CHAIRMAN.—It is quite evident, ladies and gentlemen, this is an indication of a forward movement. It is equally evident that we are already allowing our Secretary to be overworked, so that we cannot move forward, and it is quite evident that we must aim at increasing our staff. It is equally evident that one way of doing that is for the members and associates to aim at increasing our numbers. It has long appeared to me that this Society is not nearly as fully representative in our members as it ought to be for the valuable work which it is doing, and for the prestige which it has. I believe that there are a large number of people who, with a very little inducement, could be found to join this Society, so I am going to make an impertinent remark which I only hope will produce living matter, *i.e.*, that you who are present should each of you try if you cannot find some friend, scientific or otherwise, forthwith to join the Institute, and thus you will try from this little cell to set forth a new line of vital action which shall bring out still more good from the most important work of the Victoria Institute.

The SECRETARY.—I have only to say that if every member and associate was as active in getting members and associates to join as our Chairman, we should probably double our numbers in the forthcoming year.

The CHAIRMAN.—Now, thanking the Professor for this interesting paper, we adjourn.

Communication from Lord GRIMTHORPE, LL.D. :—

I did not receive Dr. Beale's interesting paper in time to write anything on it for the meeting on June 3rd. I had been thinking on the subject occasionally in consequence of the discussion started by Lord Kelvin, and continued until *The Times* found they had been too much occupied with politics and hundred year old news, and attempts to get relief from its encyclopædic speculation. Indeed I had, as you know from former papers of mine, asked the question, "How did the world evolve itself and all the beauty of nature, and how are all its laws maintained"? Dr. Beale's difficulty about such internal forces of vegetable matter had been in my mind aggravated

by the failure of any philosopher of genius enough to invent an accepted solution of the rising of sap in trees, was aggravated by the rejection of mere capillary attraction to account for it, as it was for a time thought to do. And there are the heavy heads of such things as sunflowers to increase the puzzle. Indeed, our oldest law called gravity has not got beyond the region of universal fact—a totally different thing from any prime cause of it. Weight seems so natural that we are apt to forget that Newton only proved it as a fact, and all subsequent experience has only confirmed it as an universal law. Few people reflect what would be the condition of a world, and still more, of a universe without it, in which nothing would stand firm without bonds of some kind. Or you may realize it by simply throwing a few corks on to a large basin full of water, out of contact with and not very near each other, which will soon settle for themselves to join each other and the basin. And now the general puzzle is perhaps increased by the gradual reduction and at last abolition of any solid atoms, which are dismissed for mere "emanations" of undemonstrable vibrating entities, as both electricity and light are at last pronounced to be. Even a watch main-spring only does its work by cohesion (which is only attraction completed) of its particles in the old popular sense of the banished atoms. All the chemical affinities too, are only attractions from no known or yet imagined prime cause, except the one called (in banished language) creation, and maintenance by an omnipotent and omnipresent force and will, which plainly foresaw what behaviour it would cause. The famous Tyndalic dogma of a promise and potency of life to dead matter is transparent nonsense, invented to conceal ignorance by fine words. All these forces are quite as inconceivable without a prime cause as the entity called life, which is only the power to attract and "assimilate" the air and water and other materials for repairing decay or destruction—or, the knowledge and power to lay eggs and all other seeds, which in their turn grow up to imitate their parents and begin the same course again *ad infinitum*. The head of the Birmingham University, Sir Oliver Lodge, quoted Aristotle's knowledge of such things as a reason for sticking to Greek learning, which really told us nothing. And he did not answer any of the above questions, which must have been somewhere in the mind of such a contemptuous philosopher as he appeared in the aforesaid great diffusion of universal knowledge,

and you will see them approach faster as they get near. Meanwhile we go on blundering and trade-unionising against all practical knowledge of how to do or to improve anything that is wanted; as if the only practical rule of life were to get the most pay for the least and worst work that can be sold for more than it cost the doer of it, and yet talking of "Labour" as the only potentate worth acknowledging. Had we not better begin again at the other end, as some prime Author and Maintainer of the universe did, who not only made His own laws but enforces them every minute?

As I once wrote for you a paper on "Beauty of Nature*" with the same general object as the preceding one of Dr. Beale's, I invite your members to reflect what answer they or anybody can give to the question suggested just now by a short walk, in this suddenly fine afternoon, in the garden,—What made merely promiscuously planted oak trees look so beautiful? Certainly not I, some thirty years ago, when I planted most of them at random; and certainly not my gardener. But I and the persons with me all exclaimed at it, and then it came into my head to ask this question, for any of your members to answer.

And reverting to universal gravity, let me tell those who do not know, that Newton's friend Paley reminded the readers of his admirable book called *Natural Theology*, which is better reading than any scientific one that I know or ever knew, that he asked therein how gravity can be accounted for; and that he anticipated the erroneous dictum of a well-known atheistic philosopher, that the law of gravity is only "the expression of a necessary law of space." It is nothing of the kind until he establishes the new theory that gravity is a mere emanation of straight lines of attraction in every direction.

Communication by Rev. J. Rate, M.A.:—

I am much interested in Professor Beale's paper, and am glad that it endorses Lord Kelvin's statement, viz.:—that "Modern Biologists are coming once more to a firm acceptance of something; and that is—a Vital principle."

* *Trans. Vict. Inst.*, vol. xxi (1887–88).

But I see no reason why the same Almighty Power which is exerted in the creation and support of living matter should not be equally exerted in maintaining the laws which govern inanimate matter.

Newton in his immortal work, the *Principia*, closes it by an argument in which he treats of the attributes of God as manifested in the laws which govern the material world, concluding, "*Et hæc de Deo, de quo utique ex phænominis disserere, ad philosophiam nateralam pertinet*," and then he adds, "*hypotheses non fingo*."

If I may be permitted, I will add a note on Causation which I published many years ago. "A fallacy arises, I think, from viewing the laws of Nature too exclusively of the material world. Looking on Nature, as it is, a great and connected whole, consisting of matter, force, organic life in the vegetable and animal world, sentient and psychical life in man and animals, and spiritual life in man—we find each lower law dominated in its turn by the law of the higher existence. Thus the laws of inanimate matter are dominated and interfered with by the laws of organic life in plants and animals; the laws of organic life are dominated by the laws of psychical life in animals and man; and in man the laws of psychical life which he derived from Adam are dominated, when he 'puts on the new man,' by the law of the 'Spirit of life,' which he derives from union to Christ. The first man Adam was made εἰς ψυχὴν ζῶσαν; the last Adam was made εἰς πνεῦμα ζωοποιοῦν (1 Cor. xv, 45). Thus one law controls another; the higher controls the lower, interferes with its usual unimpeded operations and effect; but is no violation of it."

What first satisfied the mind of Socrates in inquiring into the nature of Causation, was the saying of Anaxagoras, εως ἄρχ Νοῦς ἐστιν ὁ διακοσμῶν τε καὶ πάντων αἴτιος. "Having heard a certain person reading once in a book, as he said, by Anaxagoras, to the effect that it is a Mind which regulates, and is the Cause of all things, I was indeed delighted with such a theory of Causation; and it appeared to me in a manner to be quite just for Mind to be the Cause of everything; and I supposed, if such were the case, that the regulating Mind sets all things in order, and disposes them severally in such a mode as they may best abide in." (*Platonis Phædo*, Ch. xlvi.)

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Z.

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OF

The Victoria Institute,

OR

Philosophical Society of Great Britain.

Adopted at the First Annual General Meeting of the Members and Associates, May 27th, 1867, with Revisions of 1874–75.

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1. THE VICTORIA INSTITUTE, or PHILOSOPHICAL SOCIETY OF GREAT BRITAIN, is established for the purpose of promoting the following objects, viz.:—

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Fourth. To publish Papers read before the Society in furtherance of the above objects, along with full reports of the discussions thereon, in the form of a Journal, or as the Transactions of the Institute.

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Seventh. To found a Library and Reading Rooms for the use of the Members and Associates of the Institute, combining the principal advantages of a Literary Club.

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* *Exception:* If an Associate has been selected, it has been at an Annual General Meeting, and then only after the whole of the Members had been consulted, and no disapproval signified.

more (not exceeding seven) Vice-Presidents, a Treasurer, one or more Honorary Secretaries, and twelve or more (not exceeding twenty-four) Ordinary Members of Council, who shall be elected at the Annual General Meeting of the Members and Associates of the Institute. But, in the interval between two Annual Meetings, vacancies in the Council may be filled up by the Council from among the Members of the Society; and the Members chosen as Trustees of the funds of the Institute shall be *ex officio* Members of Council.

3. Any person desirous of becoming a Member or Associate shall make application for admission by subscribing the Form A of the Appendix, which must be signed by two Members of the Institute, or by a Member of Council, recommending the candidate for admission as a Member; or by any one Member of the Institute, for admission as an Associate.

4. Upon such application being transmitted to one of the Secretaries, the candidate for admission may be elected by the Council, and enrolled as a Member or Associate of the Victoria Institute, in such manner as the Council may deem proper; having recourse to a ballot, if thought necessary, as regards the election of Members; in which case no person shall be considered as elected unless he have three-fourths of the votes in his favour.

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12. Should there appear cause, in the opinion of the Council, for the exclusion from the Society of any Member or Associate, a private intimation may be made by direction of the Council, in order to give such Member or Associate an opportunity of withdrawing from the Society; but, if deemed necessary by the Council, a Special General Meeting of Members shall be called for the purpose of considering the propriety of expelling any such person: whereat, if eleven or more Members shall ballot, and a majority of those balloting shall vote that such person be expelled, he shall be expelled accordingly. One month's notice, at least, shall be given to the Members of any such Special General Meeting.

13. Non-resident Members and Associates, or others desirous of promoting the objects and interests of the Institute, may be elected by the Council to act as corresponding Members abroad, or as Honorary Local Secretaries, if within the United Kingdom, under such arrangements as the Council may deem advisable.

14. The whole property and effects of the Society shall be vested in two or more Trustees, who shall be chosen at a General Meeting of the Society. The Trustees are empowered to invest such sums as the Council may, from time to time, place in their hands, in, or upon any of the Stocks, Funds, or Securities, for the time being, authorized by statute for the

investment of trust funds by trustees, and shall have the usual powers of trustees in regard thereto. [The President, Hon. Treasurer, and Hon. Secretary may officially give effect to such resolutions as a General Meeting may pass in regard thereto.]

14*a*. All moneys received on account of the Institute shall be duly paid to its credit at the Bankers, and all cheques shall be drawn, under authority of the Council, and shall be signed by the Honorary Treasurer and Honorary Secretary.

15. The accounts shall be audited annually, by a Committee, consisting of two Members,—one of whom may be on the Council,—to be elected at an Ordinary Meeting of the Society preceding the Anniversary Meeting. This Committee shall make a written Report to the Council at the first Meeting after such audit, and also to the Institute, upon the day of the Annual General Meeting,—stating the balance in the Treasurer's hands and the general state of the funds of the Institute.

16. Both Members and Associates shall have the right to be present to state their opinion, and to vote by show of hands at all General and Ordinary Meetings of the Society; but Members only shall be entitled to vote by ballot, when a ballot is taken in order to determine any question at a General Meeting.

§ III. *Bye-Laws* (Privileges).

1. A Member or Associate, when elected, shall be so informed by the Secretary in a printed copy of the letters, Form B, in the Appendix.

2. Members and Associates shall not be entitled to any privileges, or have the right to be present, or to vote at any of the Meetings of the Society, till they have paid the contributions due by them.

3. Annual subscriptions shall be considered as in arrear, if not paid on or before 31st March in each year, or within three months after election, as the case may be.

4. Should any annual subscription remain in arrear to the 30th June, or for six months after election, the Treasurer shall cause to be forwarded to the Member or Associate from whom the subscription is due, a letter, Form D, in the Appendix, unless such Member or Associate reside out of the United Kingdom; in which case the Form D shall not be sent unless the subscription continues unpaid till the 30th September.

5. If any arrears be not paid within twelve months, the Council shall use their discretion in erasing the name of the defaulter from the list of Members or Associates.

6. Members shall be entitled to introduce two Visitors at the Ordinary Meetings of the Society; and to have sent to them a copy of all the Papers read before the Society, which may be printed in its Transactions or otherwise, and of all other official documents which the Council may cause to be printed for the Society; they will also be entitled to a copy of all such translations of foreign works or other books as are published under the auspices of the Society in furtherance of Object 6 (§ I.).

7. Associates may introduce two Visitors at the Ordinary Meetings, and shall be entitled to all the minor publications of the Society, and to a copy of its Transactions during the period of their being Associates, but not to the translations of foreign works or other books above referred to.* It shall, however, be competent to the Council of the Society, when its funds will admit of it, to issue the other publications of the Society to Associates, being ministers of religion, either gratuitously or at as small a charge as the Council may deem proper.

8. When it shall be found necessary to send the letter, Form D, to any Member or Associate who may be in arrear, the printed papers and other publications of the Society shall cease to be sent to such Member or Associate till the arrears are paid; and, until then, he shall not be allowed to attend any Meeting of the Society, nor have access to any public rooms which may be in its occupation.

9. The Library† shall be under the management and direction of the Council, who are empowered to designate such works as shall not be allowed to circulate.

10. Each Member‡ shall be allowed to borrow books from the Library, and to have not more than three volumes in his possession at the same time; pamphlets and periodical publications not to be kept above fourteen days, nor any other book above three weeks.

11. Members who may borrow books from the Library shall be answerable for the full value of any work that is lost or injured.

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* These, as well as the Transactions issued in the years previous to their joining, may be purchased at half price.

† For the use of Members and Associates.—*See 7th Object.*

‡ Members only are allowed to take books away.

12. Periodical publications shall remain on the table for a month ther books for a fortnight, after they are received.

13. When a book or pamphlet is wanted, and has been the stipulated time in the possession of any Member, the Secretary shall request its return, and a fine of threepence a day shall be incurred for every day it may be detained, which fine shall commence on the third day after the transmission of the notice in the case of town Members, and after the sixth day in the case of country Members; and until the return of such works, and the discharge of all fines incurred, no further issue of books shall be permitted to the Member applied to.

14. The books shall be ordered in for inspection at such times as the Council shall appoint, and a fine of half-a-crown shall be incurred for neglecting to send in books by the time required in the notice.

15. A book shall lie on the Library table in which Members may insert, for the consideration of the Council, the titles of such works as they desire to be purchased for the Institute.

§ IV. *Bye-Laws* (General, Ordinary, and Intermediate Meeting).

1. A General Meeting of Members and Associates shall be held annually on May 24th (being Her late Majesty's birthday, and the Society's anniversary), or on the Monday following, or on such other day as the Council may determine as most convenient, to receive the Report of the Council on the state of the Society, and to deliberate thereon; and to discuss and determine such matters as may be brought forward relative to the affairs of the Society; also, to elect the Council and Officers for the ensuing year.

2. The Council shall call a Special General Meeting of the Members and Associates, when it seems to them necessary, or when required to do so by requisition, signed by not less than ten Members and Associates, specifying the question intended to be submitted to such Meeting. Two weeks' notice must be given of any such Special General Meeting; and only the subjects of which notice has been given shall be discussed thereat.

3. The Ordinary Meetings of the Society shall usually be held on the first and the Intermediate Meetings on the third Monday evenings in each month, from November to June inclusive, or on such other evenings

as the Council may determine to be convenient: and a printed card of the Meetings for each Session shall be forwarded to each Member and Associate.

4. At the Ordinary and Intermediate Meetings the order of proceeding shall be as follows: The President, or one of the Vice-Presidents, or a Member of the Council, shall take the chair at 4.30 o'clock precisely, the minutes of the last Ordinary or Intermediate Meeting shall be read aloud by one of the Secretaries, and, if found correct, shall be signed by the Chairman; the names of new Members and Associates shall be read; the presents made to the Society since their last Meeting shall be announced; and any other communications which the Council think desirable shall be made to the Meeting. After which, the Paper or Papers intended for the evening's discussion shall be announced and read, and the persons present shall be invited by the Chairman to make any observations thereon which they may wish to offer.

The claims of Members and Associates to take part in a discussion are prior to those of Visitors. The latter when desiring to speak upon any Paper, must first send their cards to the Chairman and ask permission (unless they have been specially invited by the Council "to attend, and join in considering the subject before the Meeting," or are called upon by the Chairman). 1875.

5. The Papers read before the Society, and the discussions thereon, fully reported, shall be printed by order of the Council; or, if not, the Council shall, if they see fit, state the grounds upon which this Rule has been departed from, in the printed Journal or Transactions of the Society.

6. The Council may at their discretion authorize Papers of a general kind to be read at any of the Ordinary or Intermediate Meetings, either as introductory lectures upon subjects proper to be afterwards discussed, or as the results of discussions which have taken place, in furtherance of the 5th Object of the Society (§ I.).

7. With respect to Intermediate Meetings, the Papers read at which are not necessarily printed nor the discussions reported,* the Council at its discretion, may request any lecturer or author of a Paper to be read thereat, previously to submit an outline of the proposed method of treating his subject.

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* So arranged when the "Intermediate Meetings" were commenced, 16th January, 1871.

8. At the Ordinary or Intermediate Meetings no question relating to the Rules or General Management of the affairs of the Society shall be introduced, discussed or determined.

§ V. *Bye-Laws* (Council Meetings).

1. The Council shall meet at least once every month from November to June inclusive, or at any other time and on such days as they may deem expedient. The President, or any three Members of the Council, may at any time call a Special Meeting, to which the whole Council shall be summoned.

2. At Council Meetings three shall be a quorum ; the decision of the majority shall be considered as the decision of the Meeting, and the Chairman shall have a casting vote.

3. Minutes of the Proceedings shall be taken by one of the Secretaries, or, in case of his absence, by some other Member present, whom the Chairman may appoint ; which Minutes shall afterwards be entered in a minute-book kept for that purpose, and read at the next Meeting of the Council, when, if found correct, they shall be signed by the Chairman.

§ VI. *Bye-Laws* (Papers).

1. Papers presented to be read before the Society shall, when read, be considered as the property of the Society, unless there shall have been any previous engagement with its author to the contrary; and the Council may cause the same to be published in any way and at any time they may think proper after having been read. If a Paper be not read, it shall be returned to the author; and, if a Paper be not published within a reasonable time after having been read, the author shall be entitled himself to publish it, and he may borrow it for that purpose.

2. When a Paper is sent to the Society for the purpose of being read, it shall be laid before the Council, who shall refer it to two of that body, or of the other Members or Associates of the Society whom they may select, for their opinions as to the character of the Paper and its fitness or otherwise for being read before the Society, which they shall state as briefly as may be, in writing, along with the grounds of their respective opinions. Should one of such opinions be adverse to the Paper and against its being read before the Society, then it shall be referred to some other referee, who is unaware of the opinion already pronounced upon the Paper, in order that he may state his opinion upon it in like manner. Should this opinion be adverse to the Paper, the Council shall then

consult and decide whether the Paper shall be rejected or read ; and, if rejected, the Paper shall be returned to the author with an intimation of the purport of the adverse opinions which have been given with respect to it; but the names of the referces are not to be communicated to him, unless with their consent or by order of the Council. All such references and communications are to be regarded as confidential, except in so far as the Council may please to direct otherwise.

3. The Council may authorize Papers to be read without such previous reference for an opinion thereon ; and when a Paper has been referred, and the opinion is in favour of its being read in whole or in part, the Council shall then cause it to be placed in the List of Papers to be so read accordingly, and the author shall receive due notice of the evening fixed for its reading.

4. The authors of Papers read before the Society shall, if they desire it, be presented with twenty-five separate copies of their Paper, with the discussion thereon, or with such other number as may be determined upon by the Council.

§ VII. *Bye-Laws* (General).

1. The government of the Society, and the management of its concerns are entrusted to the Council, subject to no other restrictions than are herein imposed, and to no other interference than may arise from the acts of Members in General Meeting assembled.

2. With respect to the duties of the President, Vice-Presidents, and other Officers and Members of Council, and any other matters not herein specially provided for, the Council may make such regulations and arrangements as they deem proper, and as shall appear to them most conducive to the good government and management of the Society, and the promotion of its objects. And the Council may hire apartments, and appoint persons not being Members of the Council, nor Members or Associates of the Institute, to be salaried officers, clerks, or servants, for carrying on the necessary business of the Society; and may allow them respectively such salaries, gratuities, and privileges, as to them, the Council, may seem proper ; and they may suspend any such officer, clerk or servant from his office and duties, whenever there shall seem to them occasion ; provided always, that every such appointment or suspension shall be reported by the Council to the next ensuing General Meeting of the Members to be then confirmed or otherwise as such Meeting may think fit.

FORM A.

FORM OF APPLICATION *for the Admission of Vice-Patrons, Members, or Associates of the* VICTORIA INSTITUTE.

[*Date*]________________19

*I hereby desire to be enrolled a** ________ *of the* VICTORIA INSTITUTE, OR PHILOSOPHICAL SOCIETY OF GREAT BRITAIN,

* *Here insert* Vice-Patron, *or* Member, *or* Life Member, *or* Associate, *or* Life Associate.	*Candidate's ordinary Signature, and full name, if necessary.*	________________
	Title, Profession, University degree, &c., or other distinction.	________________
	Address	________________
	If an Author, the name of the Candidate's works may be here stated.	________________

When filled this form is to be sent to the

Honorary Secretary of the VICTORIA INSTITUTE,

8, Adelphi Terrace, Strand, London, W.C.

FORM B.

SIR, 19 .

I have the pleasure to inform you, with reference to your application dated the , that you have duly been elected a of the VICTORIA INSTITUTE, OR PHILOSOPHICAL SOCIETY OF GREAT BRITAIN.

I have the honour to be, Sir,
Your faithful Servant,

To____________________ *Hon. Sec.*

FORM C.

(*Bankers*) Messrs.______________________________

* Please pay Messrs. RANSOM, BOUVERIE, & Co. my Annual Contribution of TWO GUINEAS to the VICTORIA INSTITUTE, due on the 1st of January, 19 , and the same amount on that day in every succeeding year, until further notice.

I am,
Your obedient Servant,

_19

If this Form be used, please add your Signature, Banker's Name, and the Date, and return it to the Office, Adelphi Terrace. Receipt-stamp required.

*** The above is the form for Members. The form for Associates is the same, except that the Subscription stands as "ONE GUINEA."**

FORM D.

SIR, 19 .

I am directed by the Council of the VICTORIA INSTITUTE to remind you that the Annual Contribution due by you to the Society for the year is now six months in arrears, and I have to call attention to the Bye-Laws of the Institute, § III, ¶ 4 and 8, and to request you to remit to me the amount due (viz., £) by Post-office order or otherwise, at your earliest convenience.

I have the honour to be, Sir,
Your faithful Servant,

To____________________ *Treasurer.*

FORM E.

FORM OF BEQUEST.

I give and bequeath to the Trustees or Trustee for the time being of THE VICTORIA INSTITUTE, OR PHILOSOPHICAL SOCIETY OF GREAT BRITAIN, to be applied by them or him for the purposes of the said Society, the sum of £ , if so intended "free of legacy duty." And I declare that the receipt of the Trustees or Trustee for the time being of the said Society shall be a good discharge to my Executors for the said legacy.

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ISSUED DURING PAST YEARS.

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